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ABSTRACT

The objective of the study was to analyze and specify the fundamental flying abilities which comprise the training objectives of Undergraduate Pilot Training (UPT). Results of the study will be used as a basis for structuring research on and recommendations for improvements in Air Force flying training programs. The flight training maneuvers of UPT were analyzed according to a breakdown of task elements into the cues, mental actions, and motor actions required to accomplish them. Flying tasks analyzed were found to fall into three categories; fundamental transitions, composite transitions, and continuous transitions. A set of classification rules were developed to locate any flying training task element in a specific "pigeon hole" within a taxonomic cubic structure with cues, motor actions, and mental actions serving respectively as the vertical, horizontal, and depth axes of the cube. (Author/NH)

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BEHAVIORAL TAXONOMY OF UNDERGRADUATE PILOT TRAINING TASKS AND SKILLS:

TAXONOMY REFINEMENT, VALIDATION AND OPERATIONS

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WILLIAM V. HAGIN, Technical Director
Flying Training Division

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The objective is to analyze and specify the fundamental flying abilities which comprise the training objectives of Undergraduate Pilot Training (UPT). The results of this study will be used as a basis for structuring research on and recommendations for improvements in Air Force flying training programs. The flight training maneuvers of UPT were analyzed according to a breakdown of task elements into the cues, mental actions and motor actions required to accomplish them. Flying tasks analyzed were found to fall into three categories: fundamental transitions, composite transitions and continuous transitions. A set of classification rules were developed to locate any flying training task element in a specific "pigeon hole" within a taxonomic cubic structure with a cue, motor actions and mental actions serving respectively as the vertical, horizontal and depth axes of the cube.

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The taxonomic cubic structure was refined and subsequently validated by having flying training personnel who had not participated in development of the taxonomy's classification rules and procedures use them to classify several sample tasks. The validation test resulted in an overall agreement of 82% among the test raters. This outcome was interpreted as indicating that the taxonomy could be used for the purposes for which it was developed, that is, to describe an orderly relationship between the flying tasks analyzed and the skills required in their execution.

During this phase of the study, 22 additional flight tasks were analyzed supplementing the 14 tasks analyzed previously. All the tasks analyzed were classified and the resulting skill data were further categorized according to a hierarchy of taxonomic rules. The taxonomic hierarchy was adapted to a matrix system of information categorization which was found to provide for simplified data retrieval.

PREFACE

This study was conducted under Project 1123, USAF Flying Training Development, Dr. William V. Hagin, project scientist, Task 112302, Instructional Innovations in USAF Flying Training, Mr. Gary B. Reid, task scientist.

This report presents the results of the Phase II research effort carried out under the provisions of contract F41609-73-C-0040 by Design Plus, St. Louis, Missouri 63132. Mr. Robert P. Meyer was the principal investigator for Design Plus.

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INTRODUCTION

This report presents the results of the second phase of an ongoing research program to develop a behavioral taxonomy of Undergraduate Pilot Training (UPT) tasks and skills. This research is designed to determine the fundamental flying skills taught during the UPT program and to develop a taxonomic structure which describes an orderly relationship between the tasks and skills studied. Its objective is to generate a conception of UPT that obviates the need to continually study each specific flight maneuver, or aircraft, to define training hardware and software requirements in the development of optimized flying training programs. Consequently, the taxonomy of flying tasks and skills produced by this effort will be difficult to interpret or apply in areas of training or education not as highly structured or focused as UPT. The Phase II effort began as an extension of the development of a surface task analysis, taxonomic structure and classification rules started during Phase I.

In the first phase of the program, initial surface task analyses provided descriptions of the tasks required in fourteen flight maneuvers. The surface analysis effort focused on three types of transitional flying tasks. Fundamental transitions were identified as a change from one steady state to another, such as rolling into a turn from straight and level flight. Composite transitions were developed from combinations of two or more fundamental transitional tasks in a procedural sequence; for example, to execute takeoffs, cross-country flights and landings. Continuous transitions may combine any number of fundamental and composite transitional tasks in rapid succession, to complete such flight maneuvers as loops and rolls. The surface task analysis format divided each task into sequences and each sequence into Cue (C), Mental Action (Me), and Motor Action (Mo) elements.

Taxonomic rules were developed for the systematic classification of Cue, Mental Action, and Motor Action elements of each task sequence. The approach was to extract those behavioral elements which were required for the demonstration of flying skills. Each skill, identified by the surface task analysis, was systematically subdivided until behavioral elements emerged as the smallest part of the structure.

The rules formed a taxonomic cubic structure in which Cues are represented on the vertical (x axis), Mental Actions are represented on the depth (y axis), and Motor Actions on the horizontal (z axis). The Cue face of the cube was divided into the total outcomes of the Cue rules. Likewise, the Mental Action and Motor Action faces were divided by their respective categorization rules. The result was a concise notation and classification of all skills.

Lastly, a validation research plan was developed to determine how well the taxonomy could be used. The Phase I effort thus was the groundwork upon which a simple yet meaningful taxonomic structure and classification system was built.

Initial Phase II work focused on the development of a surface analysis for twenty-two additional flight maneuvers. With the surface task analysis in hand, it was then necessary to establish the relationship between the surface analysis and the taxonomy classification rules, and to validate the use of the rules by categorizing flying skills within the taxonomic structure. Following taxonomy refinement and validation testing, a hierarchy of taxonomic rules was devised to define how flying skills could be sorted. The resulting hierarchy of rules was then adapted to a matrix system of information categorization. The matrix system was found to provide the means for a simple data retrieval system, and its operation was illustrated in selected examples of how the system could be used.

TAXONOMY REFINEMENT

Methodology - The approach to taxonomic refinement was to gain a working knowledge and understanding of classification by actually performing classification on selected tasks. Project researchers (all pilots and qualified in behavioral research) participated in trial classifications, comparing and evaluating results, revising classification rules, and adjusting the task analysis procedures developed during the first phase effort. Thus, the classification rules were improved in several iterations.

The Taxonomy Coding System - It was determined that the coding system should be meaningful in notation form so that it could be easily understood by both project researchers and the relatively untrained subjects involved in later validation procedures. A straight numbering system was rejected because of its susceptability to error and because numbers could not convey recognizable data in raw form. The recognition of data in its unprocessed form would assist not only project personnel in actual classification, but also those who would subsequently be working with this material.

The use of an alpha-numeric code was ultimately established. With this system meaningful alpha designators could be related to specific element or component areas and numbers could be used for ranking and counting. The rules adopted for coding the surface analysis were:

1. All "Fundamental" transitional tasks were coded with an F designator followed by the number of the task.

2. All "Fundamental Instrument" transitional tasks were coded with an Fi designator followed by the number of the task.

3. All "Composite" transitional tasks were coded with a Cp designator followed by the number of the task.

4. All "Continuous" transitional tasks were coded with a Ct designator followed by the task number.

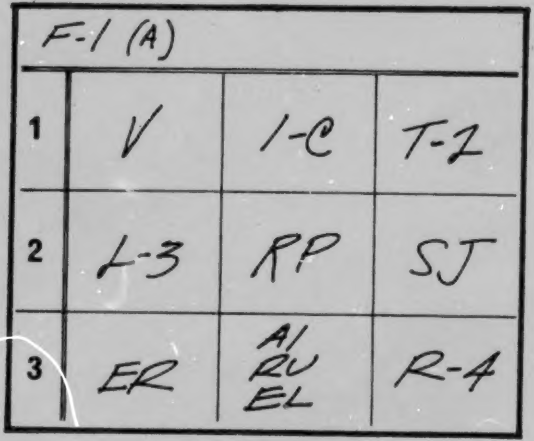
5. Within each transitional task, the following breakdown was used. Each individual sequence was given a single letter designator. Each element in a C-Me-Mo sequence was given a respective 1-2-3 identifier.

Thus, any task, task sequence, or element within a sequence could be annotated in a classification matrix, and when so noted could be retraced to the task whenever necessary.

The behavioral element categories were directly related to the classification rules of the taxonomy. These categories conveyed the classified data derived from information in the task sequence of the surface analysis. It was important that a coding method be devised for these behavioral elements, which would be simple yet flexible so that control could be maintained over a potentially complex system.

Table 1 shows the alpha and alpha-numeric coding system adopted for classification. The codes were selected to show a direct relationship to the behavioral elements. The alpha-numeric coding system was thus compatible with both the surface analysis and the classification rules.

The Notation and Response System - The coding system for both the surface analysis and the taxonomy rules, represented by the behavioral element categories, allowed researchers to classify data in a simple, but meaningful notation system. A response card was designed to hold the classified data of one C-Me-Mo sequence. Figure 1 shows a completed full size response card. This card was sized to be large enough for easy hand notation of data by researchers and validation subjects, yet sufficiently small to fit into a full size working categorization system.



F-1 (A)			
1	V	1-C	T-2
2	L-3	RP	SJ
3	ER	A/ RU EL	R-4

Figure 1. Example Response Card

Table 1. Behavioral Element Categories and Coding System

1. CUES

KIND	COMPLEXITY	TOTAL INPUTS	
Visual.........V	1-Cue........1-C	T-1	T-5
Aural..........A	2-Cues.......2-C	T-2	T-6
Control........C	3-Cues.......3-C	T-3	T-7
Motion.........M	4-Cues.......4-C	T-4	T-8...etc.

2. MENTAL ACTION

COMPLEXITY	INFORMATION PROCESSING	DECISION PROCESSING
1st. Level....L-1	Specific Cue Processing....SC	Simple Judgement......SJ
2nd. Level....L-2	Memory Recall Processing....RP	
3rd. Level....L-3	Multi-Cue Processing....MC	Complex Judgement......CJ
4th. Level....L-4	Iterative Processing....IP	

3. MOTOR ACTION

CONTINUITY	CONTROL OUTPUT	COMPLEXITY
Establish Attitude.....EA	Aileron..........AI	1st. Rank.......R-1
	Elevator.........EL	2nd. Rank.......R-2
	Rudder...........RU	
Establish Rate of Attitude Change.......ER	Throttle.........TH	3rd. Rank.......R-3
	Trim.............TR	4th. Rank.......R-4
	Other Outputs....OO Speed Brakes - Gear Wheel Brakes - Flaps	5th. Rank.......R-5

The Maneuver Analysis Kit Concept - An evaluation of the taxonomic system was required to establish the compatibility of the surface analysis and the classification rules. It was determined that this need and a number of other objectives could be achieved by the formalization of rules, instructions, and surface analyses into a complete package. This systematic approach was developed and called the Undergraduate Pilot Training (UPT) Maneuver Analysis Kit (kit). At the time the kit was begun, researchers were also looking for a suitable package form to satisfy the validation objectives of the taxonomy program. The kit proved to be such a package and became the focal point to:

1. Express taxonomy rules in a more simplified language.

2. Explain in the form of specific classification instructions, how the taxonomy rules were to be used in conjunction with the surface analysis.

3. Organize taxonomy components (i.e. rules, instructions and analyses) so that they could be evaluated by selected USAF instructor pilots and student pilots.

Figure 2 shows an illustration of the analysis kit format. Although the material contained within the kit was modified through working experience, the basic format remained unchanged. The three column format was adopted in order to present as much pertinent information to the evaluator as possible and show graphically the relationship between the classification instructions, the surface analysis and behavioral element categories. The kit was thereby tailored to the user, either a project researcher or other personnel involved in the validation research plan. The kit was ultimately used successfully to:

1. Evaluate classification responses of USAF pilot subjects in terms of consistency and determine areas of misunderstanding and ambiguity in the taxonomy components.

2. Evaluate the workability of the proposed coding system and response method in actual practice.

3. Produce an organized taxonomy classification kit which would be used by researchers to classify tasks during the project.

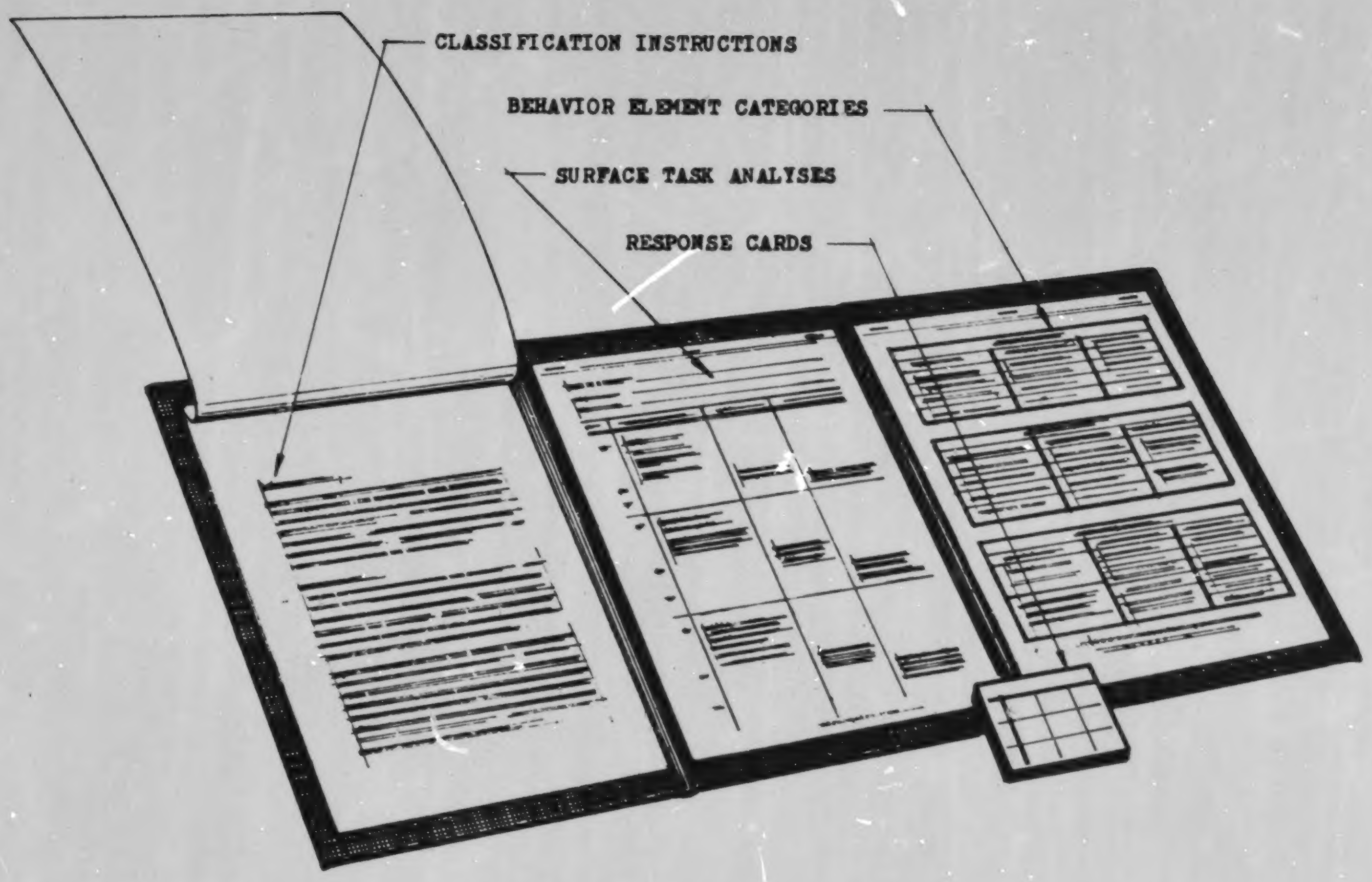

CLASSIFICATION INSTRUCTIONS
BEHAVIOR ELEMENT CATEGORIES
SURFACE TASK ANALYSES
RESPONSE CARDS

Figure 2. UPT Maneuver Analysis Kit

Results - There were a number of iterations during the development of classification instructions from the taxonomic rules. These iterations were required to satisfy the basic criteria of simplicity and clarity. They also provided the first working understanding of the relationship between the taxonomy rules and the surface analysis. This understanding brought about a greater insight into the actual problems of stating instructions with greater clarity, and pointed out a number of areas in the analysis where vagueness existed because of phrasing, punctuation, and at times, even page layout deficiencies.

In order to ensure as much objectivity as possible during this formative stage, the newly developed materials were evaluated by those researchers who had not taken part in their development. This was true not only for the development of instructions, but also for any changes made in the surface analysis or rules. This method of operation provided a continuing fresh outlook by researchers and proved an effective work refinement. In all cases during this evaluation period, researchers were asked to follow instructions, give singular responses and critique all data presented in the kit so those suggestions resulting from this hands-on experience could be used to refine the instructions, rules and surface analysis. During this period, classification agreement between researchers was noted during each iteration to gauge the trend of improvement.

The refinement of instructions was carried out simultaneously with the revision of taxonomy rules. Instructions which were adopted in the final form of the kit are contained in Appendix A.

Revised Taxonomy Rules - Initial efforts to classify skills produced by the surface task analysis according to established rules proved workable in practical application. This effort indicated that fundamental, composite, and continuous transitional tasks, described in the analysis, could be successfully classified into most behavioral elements (Table 1) with a high degree of agreement among evaluators.

Areas were discovered however, where some taxonomic categories could be refined for clarity or expanded to make the behavioral categories more meaningful to training specialists. These areas are explained in detail, and are the final set of rules established for skill classification. These rules provided the basis for the classification instructions developed for the kit. They may be most easily understood by referring to the appropriate part of Table 1 as the Cue, Mental Action, and Motor Action classification rules are discussed.

Revised Rules for Cue Classification

1. Identify all of the different kinds of cues used in the task sequence.

2. Determine the complexity of the cues.

3. Determine the total number of cue inputs.

Rationale for Cue Categories - The initial step in the classification process was to identify and define the cues perceived by the pilot in the performance of his task. The available cues enumerated in the task analysis included: visual, aural, control and motion. Visual cues involved anything the pilot saw. They were normally the primary cues the pilot used for determining aircraft performance. Two forms of visual cues exist: those of the outside world which inform the pilot of aircraft attitude, altitude, rate, and position; and inside cockpit cues where specific instruments display attitude, altitude, rate, and position information for the pilot to monitor. Aural cues of the flight environment were considered for classification purposes only when they differed perceptibly from the previous state, thus a normal environmental sound was not considered a cue. The cues identified as controls were the pressures transmitted by the aircraft control system (stick, rudder, and throttle) to the pilot's hands, or feet, when the controls were displaced. These pressures were primarily tactile and an important source of feedback to the pilot when they were not neutral. Neutral control pressure occurred whe the pilot was not moving the controls or holding a contro out of its rest, or trimmed, position. Neutral control pressures were not identified as cues for the taxonomy. Motion provided the final cue considered in the cue classification process. A motion cue was said to be present when a condition other than normal (positive one G) flight was perceived. This cue includes rolling, pitching, buffeting, accelerating, or decelerating in any aircraft.

A basic component of any classification system of human performance must address itself to the complexity of the elements under consideration. It was determined that cue complexity would be classified by the number of kinds of cues involved in a task sequence. The total number of cue inputs was a further refinement of cue complexity and used for the final category selection.

Several approaches to creating meaningful cue categories were attempted before settling on those described previously. A change in the original classification system as described in the Phase I report replaced the old agreement category with total inputs. The conflicting or non-conflicting cue choices of the agreement category were meaningful in theory as they were to indicate those skills which contained cues that conflicted with the primary cues. In practice however, there were no instances where a conflicting cue could be identified from the surface task analysis.

Revised Rules for Mental Action Classification

1. Determine the complexity of the mental action involved. Complexity is determined by noting the number of kinds of cues as found in the cues rule, and then count the number of different control and discrete actions in the motor action column of the task sequence, and identify the proper category from the following combinations:

One Cue- - - - - - Zero or one control action
One or more Cues - Non-coordinated control actions
One or more Cues - Coordinated control actions
Two or more Cues - Both coordinated and non-coordinated control actions

2. Select the appropriate information processing category. Compare the action verb used by the analyst in the mental action column of the task sequence with these definitions:

Specific Cue Processing- - - - - - Observes
Memory Recall Processing - - - - - - Anticipates
Multi-Cue Processing - - - - - - - - Determines
Iterative Processing - - - - - - - - Sustains

3. Determine if the mental action entry requires a simple judgment or a complex judgment. A decision based on a specific cue, fact or procedure is a simple judgment. A decision based on estimation or interpretation is a complex judgment.

Rationale for Mental Action - The mental action rules have had extensive review since their initial definition in Phase I of this study. Each of the rules evolved to its present state after several iterations. Changes were made as the result of analysis and trial applications to the task sequences of the surface analysis.

Rule No. 1 identified the relative complexity of the particular task sequence. This was done to establish the amount or level of mental activity required. The number of kinds of cues perceived, and the amount and type of motor action taken as a result of those cues determined this category. It was further determined that an important descriptor of mental complexity would be identified if the resultant motor action were divided into those actions requiring coordination and those requiring non-coordinated or sequential action. In this way a relationship between cues and motor action was established.

The changes incorporated in the mental action classification of rule No. 2 probably represented the most significant improvement in taxonomy rules made during Phase II. The concept of categorizing mental action by a description of the information processing that is taking place was formulated after extensive review of many behavioral classification systems and trial applications to the taxonomy format. All previous taxonomic schemes have relied heavily on theory and conceptualization in classifying mental activity. Definitions for the categories usually suggested for describing mental activity have overlapped considerably. From the onset, the approach was to utilize the observable inputs to and outputs of mental activity. This mental activity is referred to as Information Processing. By identifying what information processing is done, rather than how it occurs, the difficulties of describing or defending learning theories were circumvented and a focus on the task at hand - classifying behavior was maintained.

The following particular verbs contained in the surface task analysis sequences were analyzed and specific definitions relative to flying tasks were established for the taxonomy:

Observes - This behavior deals with the perception and recognition of a specific cue such as: identification of a desired airspeed or the observation of a point at which a task sequence should be started. These activities required that the cues perceived be remembered only long enough to recognize the correlation with an actual situation and the desired state. This processing utilized short term memory storage and is described as SPECIFIC CUE PROCESSING.

Sustains - This behavior occurs when a steady-state is being maintained. It may be thought of as the cyclic activity while engaged in maintaining control of the aircraft during a turn after roll in and before roll out. This is identified as CONTINUOUS ITERATIVE PROCESSING.

Anticipates - This occurs prior to a maneuver or prior to a particular part or phase of the maneuver. Anticipation always involves long term memory storage of procedures or facts about the performance of a task. This behavior is referred to as MEMORY RECALL PROCESSING.

Determines - This mental action is the most elaborate and complex in terms of the mental activity categories utilized in this taxonomy. Determination involved both short and long term memory storage. It is the process concerned with basic decision making and problem solving, and always involved multiple cues and evaluations of potential actions. This is called MULTI-CUE PROCESSING.

Rule No. 3 is a revision to the initial mental action classification rules. These categories established whether the mental action required a simple judgment by the pilot or if a complex judgment is demanded. Here a judgment decision is required on the part of the classifier. The deciding factor is whether the pilot's decision required estimation or interpretation of cues or merely recognition that a specific value has been obtained or a condition has been reached. Examples of each type of judgment are included in the kit instructions.

Rules for Motor Action Classification

1. Decide if the motor action results in the establishment of a stable attitude or produces a rate of attitude change.

2. Identify all control outputs made by the pilot in this task sequence, for example: aileron, rudder, and elevator.

3. Indicate the complexity of the motor actions taken by the pilot. Complexity is determined by selecting the appropriate complexity rank from the following list:

1st Rank - One output
2nd Rank - Non-coordinated outputs
3rd Rank - Two coordinated outputs
4th Rank - Three coordinated outputs
5th Rank - Coordinated and non-coordinated outputs

Rationale for Motor Action Classification - The rules for motor action were modified only slightly from their original form developed in Phase I. Rule No. 1 provided the taxonomy with important information about the continuity of this task element with respect to the previous or following task elements. The identification of discretes or continuous motor actions in terms of establishment of specific aircraft attitudes or a rate of attitude change was considered highly meaningful for a categorization pertaining to flying skills.

The individual motor outputs in rule No. 2 were identified by the controls the pilot operates. After determining that all motor outputs were directed toward the establishment of the aircraft's position with respect to its three dimensional environment, it was natural to define the specific motor action in terms of the control exerted on the aircraft. Hence control output categories of elevator, aileron, rudder, throttle and trim were conceived. The other motor actions that may be performed by the pilot constitute discrete actions such as moving switches or depressing buttons. These are all considered as discretes and are collectively identified for classification as "other outputs".

The complexity of the motor task may vary widely from a relatively simple task of placing the gear handle down to the complicated job of controlling pitch and bank angles in the final turn of the normal landing pattern. This complexity was directly definable in terms of the number of motor or control outputs required simultaneously. To further identify and clarify complexity levels, modified categories were chosen to isolate these outputs that require coordinated outputs, non-coordinated outputs or both. These were ranked as stated previously.

TAXONOMY RESEARCH VALIDATION

A validation study was performed to systematically explore the capabilities and limitations of the developed taxonomy. The purpose of the study was to determine how well the taxonomy could be used to categorize skills derived from the surface analysis.

To accomplish this goal, subjects completed the task of applying the taxonomy rules to a set of representative maneuver skills. The subjects, selected from among military and civilian personnel involved in flying training and flying training research at Williams AFB, Arizona, were naive to all aspects of the study. However, as the technical nature of the task analysis concerned flying, only subjects familiar with flying terminology were used. Of the twelve subjects who started the study, three were lost due to time constraints. The remaining nine had the following flying backgrounds:

4 Instructor Pilots
3 Student Pilots
1 Ex-military Pilot
1 Aviation Related Position (non-pilot)

Procedure - Individual UPT Maneuver Analysis Kits consisting of instructions, classification rules, a short sample task analysis, and two other task analyses to be classified were presented to the subjects. The sample task (Task F-1) was a transition from straight-and-level flight to a 60° coordinated turn. The main tasks were a transition from straight-and-level to a constant speed straight ahead climb (Task F-2), and a 360° overhead landing (Task Cp-2).

A project researcher read and explained the instructions and classification rules to the subjects. The sample task was classified and all questions were answered. Subjects then classified the remaining tasks mentioned in the previous paragraph. Each task element classification was recorded on a separate response card. At the completion of the study, a questionnaire was given to all subjects to obtain their comments concerning problem areas. An example of the questionnaire format and an account of questionnaire information can be found in Appendix B.

Results and Discussion - The classifications of the nine subjects who completed the study formed the basis for the data analysis. A percentage of agreement among subjects was computed for each individual classification rule. An overall agreement of 82% on Task F-2 and Task Cp-2 was found.

Additional analyses consisted of comparing the subjects' agreements on a rule by rule basis and comparison with the project researchers' classifications. Figure 3 presents the agreement levels for individual classification rules, while a detailed listing of individual rule agreements is found in Appendix B. With the limited number of subjects participating and the many variables involved, further statistical analyses were not entertained.

The high agreement among validation subject responses indicated that they could successfully apply taxonomy rules and instructions to the surface analysis. Motivation also played a very important part in the satisfactory completion of the validation material. This aspect can be noted, when observing the agreement level of cues-total outputs in Figure 3. This response required only simple counting and totaling to complete, but it had the lowest agreement level. It should also be stressed that all subjects entered the study cold and required only a few minutes of instruction for task preparation. Even the non-pilot subject showed no noticeable response difference, indicating that flying term familiarity rather than actual flying experience was a subject requirement as expected.

In order to understand the differences between validation subjects' and project researchers' classifications, the responses were divided into two groups. The first group was composed of objective rules which required an enumeration in the form of counting or listing. The second group consisted of the more subjective rules which required a decision in the form of a determination. Based on this division, complete agreement was established on the objective rules between subjects and researchers. Only 17% of disagreement existed on the subjective rules. Further, intrasubject differences between rule types did not exist as evidenced by the approximately equal agreement as noted in Figure 3.

Of the 17% disagreement, approximately 10% appeared to be a function of task sequence terminology. This terminology seemed to be the culprit as words like "rolling" and "roll" caused confusion. Air Force training gives slightly different meaning to these terms, while project researchers did not note this difference. The other 7% of disagreement appeared to be subject error.

The overall responses of the subjects from the questionnaire stated that the study could be completed, although it was difficult. This complex job required from one hour and forty-five minutes to two hours and thirty minutes to perform. There were no rules which

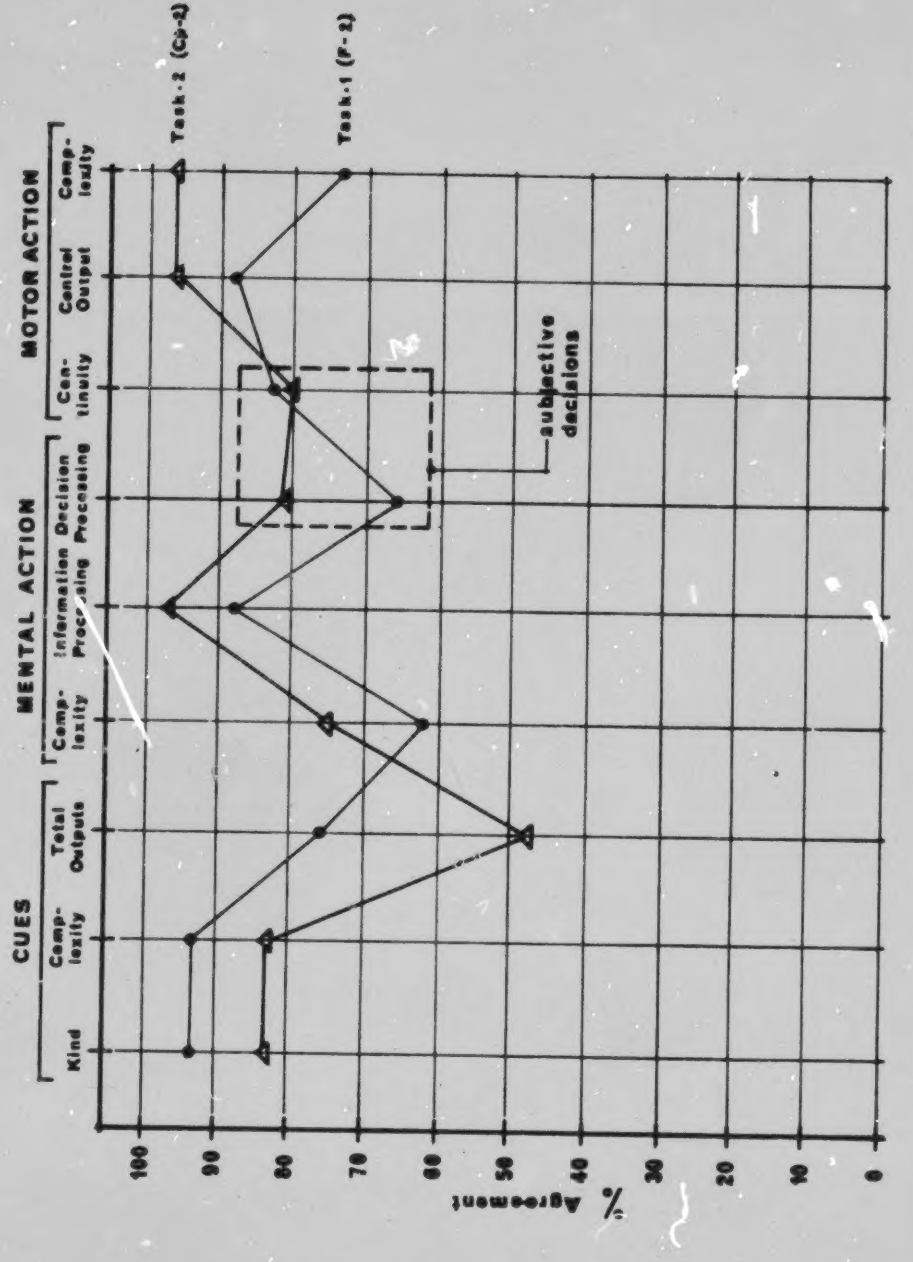


Figure 3. Validation Agreement Levels

caused more difficulty than others, but rather all rules were equally understandable. Other comments were in keeping with the notion of a difficult task by requesting a clearer format and instructions. Surprisingly little difficulty was associated with the task sequences other than terminology.

Conclusions - The use of the classification system was shown to be not only possible, but could be executed by personnel familiar with flying vocabulary. There was no requirement for skilled professionals familiar with taxonomies to accomplish classification tasks. The high overall agreement among subjects untrained in skill classification not only helped validate the system, but also showed the surface task analysis to be a useful research tool.

CLASSIFICATION MATRIX DEVELOPMENT

The two major requirements in the development of the taxonomic structure were simplicity and ultimate usefulness to future training research. To that end, only essential areas have been included in the surface task analysis, classification rules and instructions. The implementation of an intelligible alpha-numeric code for translating analysis information into response cards or raw skill data through the application of classification rules and instructions, proved relatively simple for project researchers to accomplish. A total of thirty-four visual flying tasks for both the T-37 and T-38 aircraft have been analyzed and classified in this phase. A listing of these tasks can be found in Appendix C along with the surface analysis for each task. The classification of these tasks produced a total of 307 response cards and provided the raw skill data to be incorporated in the taxonomic structure.

Procedure - In order to separate task skills into categories which would exhibit the same behavioral characteristics, a classification hierarchy was developed based on the revised classification rules established during the Phase II effort. Figure 4 shows the classification tree or hierarchy which traces the categorization lineage for the nine rules adopted.

The development of this hierarchy was based on both value judgments and empirical evaluation. An attempt was made to begin with rules, which contained the broadest information and then move to those rules containing more specific information. It was also considered desirable to give as much visibility to information which might be of greatest use to flying training researchers. Several iterations were made to determine both a useful and smooth flowing hierarchical system. It should be stated at this point that emphasis on different rules would yield a different hierarchical structure, however the results of the classification would remain unchanged.

The initial breakdown of skills dealing with simple and complex judgment was determined by practical considerations. It seemed logical, based on a concern about teaching judgments expressed by instructors during the rules validation program, that behavior should first be sorted into the kind of judgment involved in each skill. The practical considerations centered around breaking all skills into two working areas. Similar practical and operational considerations were involved in the establishment of an order in the rules for the remainder of the hierarchy. With the classification hierarchy complete,

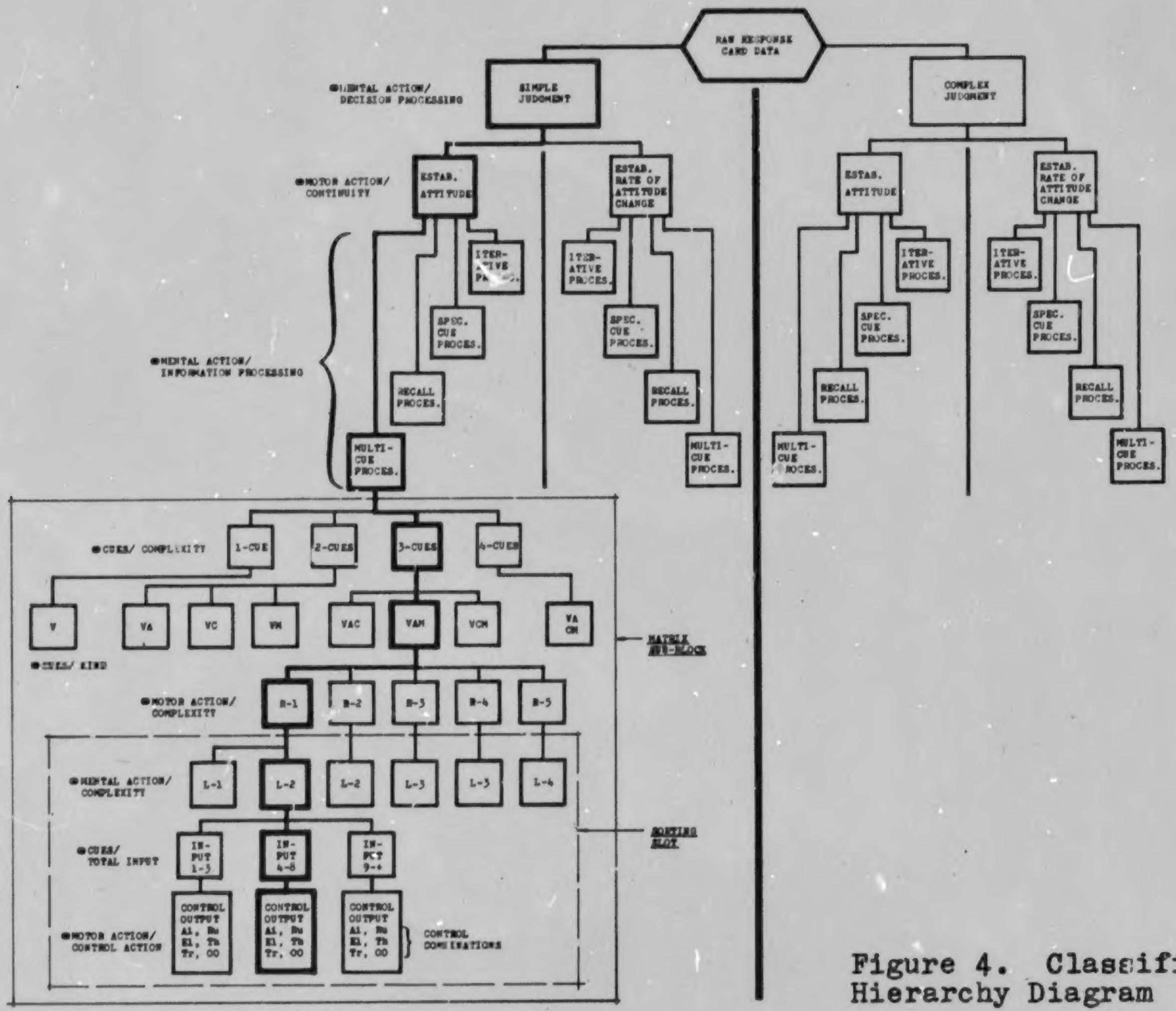

RAW RESPONSE CARD DATA
●MENTAL ACTION/ DECISION PROCESSING
SIMPLE JUDGMENT
COMPLEX JUDGMENT
●MOTOR ACTION/ CONTINUITY
ESTAB. ATTITUDE
ESTAB. RATE OF ATTITUDE CHANGE
ITER-ATIVE PROCES.
SPEC. CUE PROCES.
RECALL PROCES.
MULTI-CUE PROCES.
●MENTAL ACTION/ INFORMATION PROCESSING
●CUES/ COMPLEXITY
1-CUE
2-CUES
3-CUES
4-CUES
V
VA
VC
VM
VAC
VAM
VCM
VA CM
●CUES/ KIND
MATRIX SUB-BLOCK
●MOTOR ACTION/ COMPLEXITY
R-1
R-2
R-3
R-4
R-5
●MENTAL ACTION/ COMPLEXITY
L-1
L-2
L-2
L-3
L-3
L-4
SORTING SLOT
●CUES/ TOTAL INPUT
IN-PUT 1-3
IN-PUT 4-8
IN-PUT 9-+
●MOTOR ACTION/ CONTROL ACTION
CONTROL OUTPUT Ai, Ru El, Th Tr, OO
CONTROL COMBINATIONS

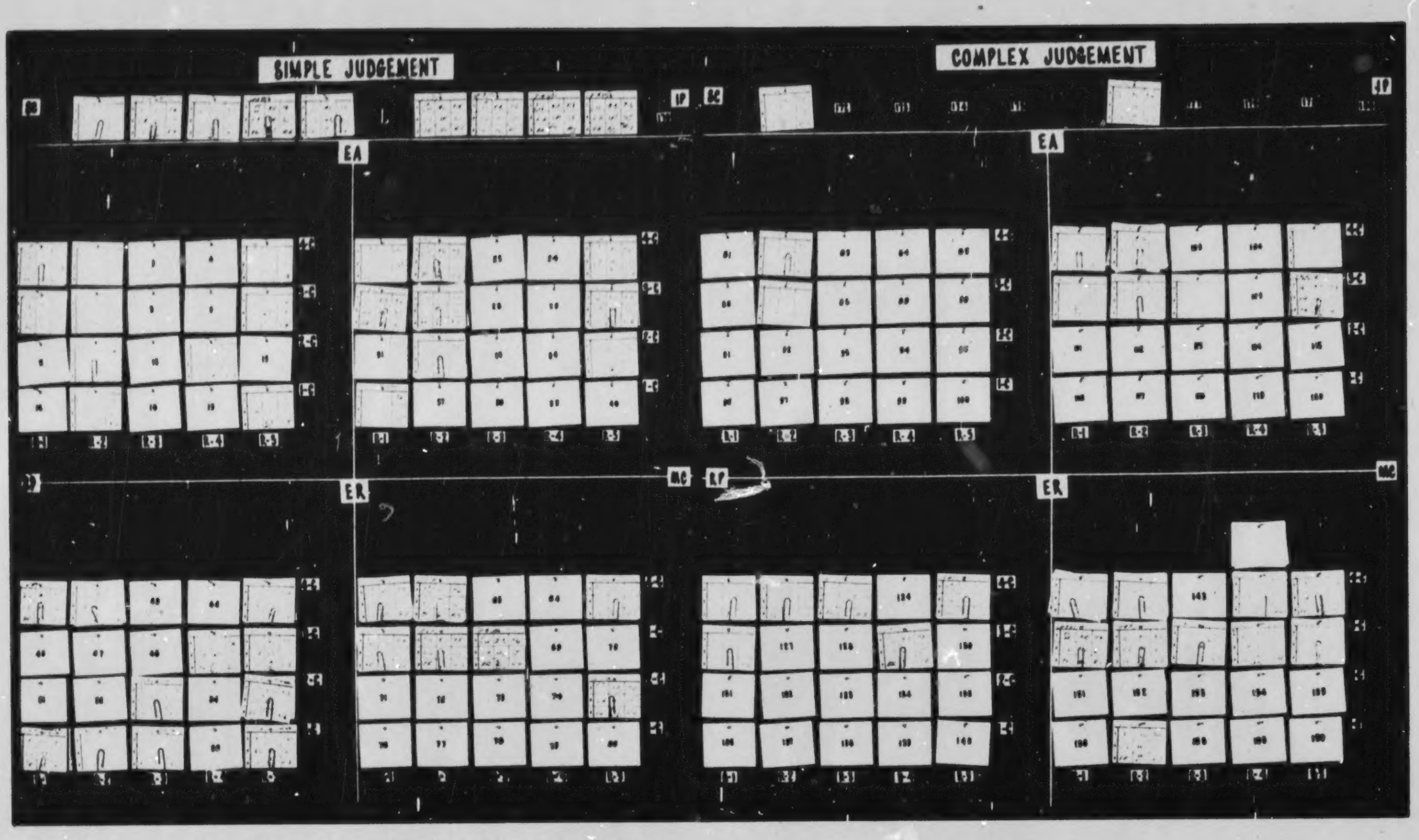
Figure 4. Classification Hierarchy Diagram

it became necessary to consider what structure would best provide the most straight-forward yet flexible manner of handling categorized information.

The Primary Classification Matrix - The fact that all classified data had been noted on individual cards offered a hands-on examination of the behavior described on each card. It also allowed the actual sorting of data cards into like groups. A matrix board was devised to hold the sorted card data. Figure 5 shows the 4 by 8 foot matrix board developed for the taxonomy. This board, though rather large, permitted researchers to stand back to view and consider the relationships among the various sorting categories. Thus, the matrix was turned from an abstract concept into a working tool with practical potential. The sorting of flying skills (as represented by behavior information noted on the data card) was accomplished in the order shown on the classification hierarchy diagram shown in Figure 4. Note that the matrix sub-blocks shown in the figure correspond to the block faces on the actual matrix. The vertical axis of each block contained four increments which handle the major cue inputs or the cue complexity rules. The horizontal axis handled the ranking of motor action complexity. Finally each division of the sub-block is called a sorting slot.

The matrix sub-block formed a three dimensional structure. In review, Phase I described a three dimensional taxonomic cubic structure for the isolation of a specific skill having the same Cues (C), Mental Actions (Me), and Motor Actions (Mo). In this cubic structure Cues were represented on the vertical (x axis), Mental Action of the depth (y axis), and Motor Action on the horizontal (z axis). The cubic structure was suggested to aid in visualizing and understanding the C-Me-Mo relationship. It was found that a three dimensional structure also evolved in actual practice and served to isolate skills with identical cues, mental actions and motor actions. The structure was applicable to the matrix board when categorization was continued into the sorting slot. At this level the cubic structure became evident. In the full size matrix board, this was accomplished by putting all like cards in a slot into basic skill groups and clipping them together as shown. These skill groups then represent the depth of the matrix sub-blocks. One rule was used to stabilize the cues-total inputs behavioral element category. This rule grouped these inputs numerically as follows:

1 - 3 Inputs were considered a grouping
4 - 6 Inputs " " " "
7 - 8 Inputs " " " "
9 + " " " "


SIMPLE JUDGEMENT
COMPLEX JUDGEMENT
RP
IP
SC
EA
EA
ER
MC
RP
ER
MC

Legend:
EA - Establish Attitude
ER - Establish Rate of Attitude Change
MC - Multi-Cue Processing
RP - Recall Processing
SC - Specific Cue Processing
IP - Iterative Processing

Figure 5. Primary Classification Matrix Board

The Primary Classification Matrix as a Data System - The rather straight forward system devised for the sorting and manipulation of skill cards on a large board was modified into a system suitable not only for use by project researchers, but also for those training specialists who would use the taxonomic data. Table 2 shows a matrix of 160 sorting slots adapted to a data system. The layout and numbering remained the same as the matrix board, however the skill cards were replaced by the number of skills occurring in each sorting slot of a particular sub-block. The darkened sorting slots represent those which contain no skill cards. It should be emphasized that a full matrix should contain sixteen sub-blocks instead of the eight shown. The shortened system stems from the fact that only twenty-two skills were found to exist for the eight blocks not represented. These skills, however, have been accounted for in a separate section at the top of the matrix beginning with sorting slot number 161. If the tasks of an entire series of flying missions were analyzed and classified, such as would be the case with a surface analysis for tactical training, the skill dispersal over the matrix probably would require a full complement of sub-blocks.

Figure 6 illustrates all the parts of the taxonomy data system. The information contained in the classification matrix has been indexed and cross-indexed so that a researcher could find, compare, and analyze skill data as it occurred across all classified tasks. Tasks and task sequences, described in the surface analysis, could be analyzed in relation to skills by relating the skill card file to the task numbering list. The data contained on each skill card can also be found as part of each task sequence in the surface analysis shown in Table 3.

Table 3. Surface Analysis with Skill Data and Matrix Numbers

TASK NO. Cp-3 **TASK** Chandelle

TASK GOAL To perform a Chandelle **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS CHANDELLE Visual-Pitch att: nose low Bank att: level Outside reference Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Cp-3(A) (60) 1 V 1-C T-3 2 L-4 RP SJ 3 ER Al Ru El R-5
2.		Anticipates climbing turn	
3.			Coordinates aileron & rudder, moves elevator

Table 2. Classification Data System Matrix

SIMPLE JUDGMENT

SC

161	162	163	164	165
5	2	4	2	2

IP

166	167	168	169	170
1	1	1	1	▨

EA/RP

	R-1	R-2	R-3	R-4	R-5
C-4	1 2	2 1	3 ▨	4 ▨	5 1
C-3	6 1	7 1	8 ▨	9 ▨	10 1
C-2	11 ▨	12 4	13 ▨	14 1	15 ▨
C-1	16 ▨	17 1	18 ▨	19 ▨	20 1

EA/MC

	R-1	R-2	R-3	R-4	R-5
C-4	21 1	22 11	23 ▨	24 ▨	25 1
C-3	26 2	27 15	28 ▨	29 ▨	30 3
C-2	31 ▨	32 9	33 ▨	34 ▨	35 1
C-1	36 1	37 ▨	38 ▨	39 ▨	40 ▨

ER/RP

	R-1	R-2	R-3	R-4	R-5
C-4	41 7	42 4	43 ▨	44 ▨	45 3
C-3	46 ▨	47 ▨	48 ▨	49 1	50 1
C-2	51 ▨	52 ▨	53	54 ▨	55 3
C-1	56 2	57 4	58 5	59 ▨	60 4

ER/MC

	R-1	R-2	R-3	R-4	R-5
C-4	61 2	62 9	63 ▨	64 ▨	65 6
C-3	66 6	67 4	68 1	69 1	70 ▨
C-2	71 ▨	72 ▨	73 ▨	74 ▨	75 4
C-1	76 ▨	77 ▨	78 ▨	79 ▨	80 ▨

COMPLEX JUDGMENT

SC

171	172	173	174	175
1	▨	▨	▨	▨

IP

176	177	178	179	180
1	▨	▨	▨	▨

EA/RP

	R-1	R-2	R-3	R-4	R-5
C-4	81 ▨	82 1	83 ▨	84 ▨	85 ▨
C-3	86 ▨	87 1	88 ▨	89 ▨	90 ▨
C-2	91 ▨	92 ▨	93 ▨	94 ▨	95 ▨
C-1	96 ▨	97 ▨	98 ▨	99 ▨	100 ▨

EA/MC

	R-1	R-2	R-3	R-4	R-5
C-4	101 2	102 13	103 ▨	104 ▨	105 1
C-3	106 4	107 4	108 1	109 ▨	110 2
C-2	111 ▨	112 ▨	113 ▨	114 ▨	115 ▨
C-1	116 ▨	117 ▨	118 ▨	119 ▨	120 ▨

ER/RP

	R-1	R-2	R-3	R-4	R-5
C-4	121 4	122 4	123 2	124 ▨	125 6
C-3	126 3	127 ▨	128 ▨	129 4	130 ▨
C-2	131 ▨	132 ▨	133 ▨	134 ▨	135 ▨
C-1	136 ▨	137 ▨	138 ▨	139 ▨	140 ▨

ER/MC

	R-1	R-2	R-3	R-4	R-5
C-4	141 11	142 25	143 ▨	144 6	145 14
C-3	146 7	147 7	148 2	149 1	150 6
C-2	151 ▨	152 ▨	153 ▨	154 ▨	155 ▨
C-1	156 ▨	157 1	158 ▨	159 ▨	160 ▨

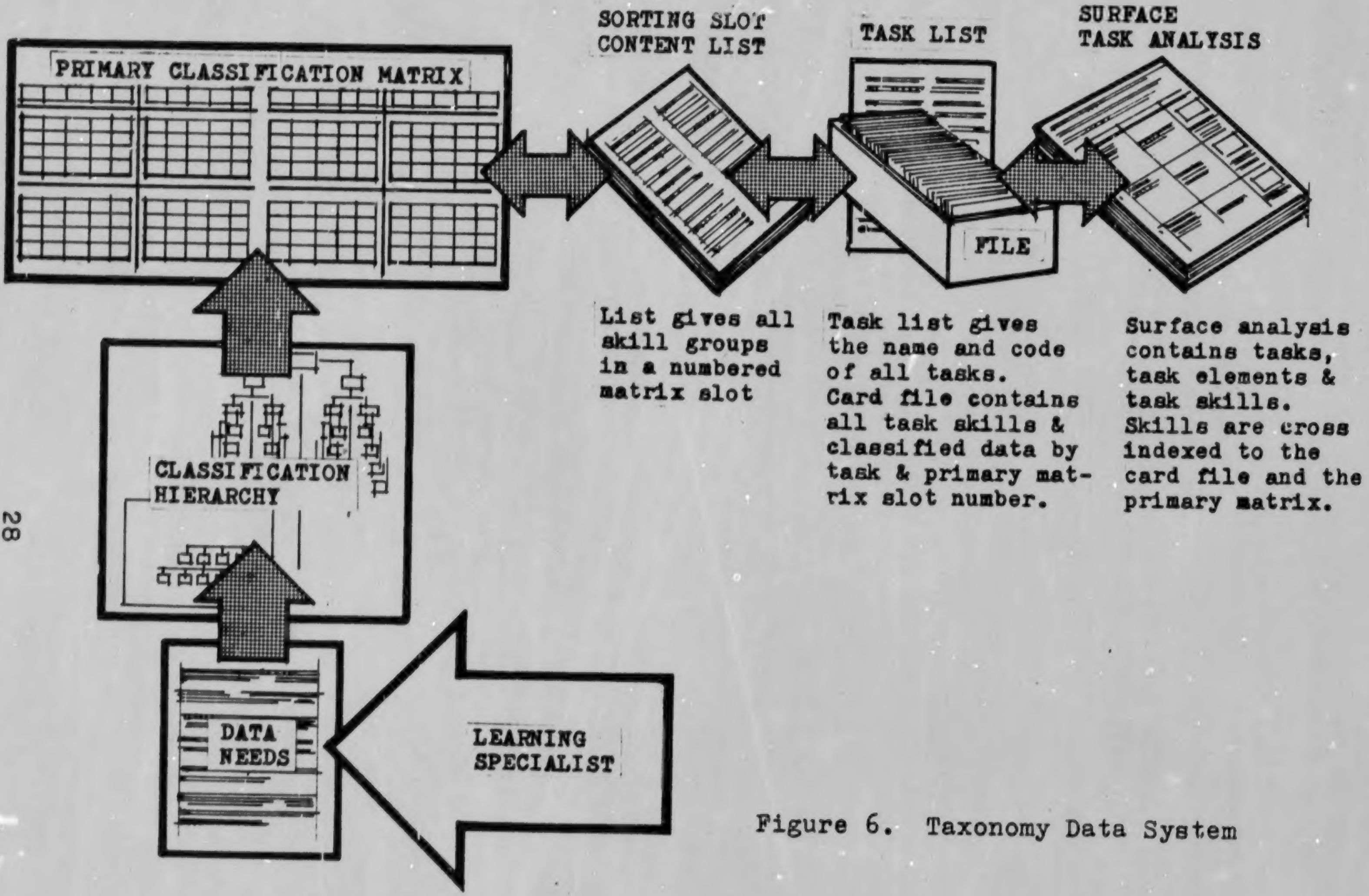

PRIMARY CLASSIFICATION MATRIX
SORTING SLOT CONTENT LIST
TASK LIST
SURFACE TASK ANALYSIS
FILE
List gives all skill groups in a numbered matrix slot
Task list gives the name and code of all tasks. Card file contains all task skills & classified data by task & primary matrix slot number.
Surface analysis contains tasks, task elements & task skills. Skills are cross indexed to the card file and the primary matrix.
CLASSIFICATION HIERARCHY
DATA NEEDS
LEARNING SPECIALIST

Figure 6. Taxonomy Data System

Task Cp-3 describes the Chandelle and is a composite transitional task. The coded data in the squares at the right of the page gives the task sequence at the top and the sorting slot number of the classification matrix. In order to find tasks requiring the same skill, the slot number can be found in the example of the sorting slot list shown in Table 4. This shows all the skills in the slot broken into basic skill groups according to the classification hierarchy. Note that as an example, Cp-3(A) is located in sorting slot 60 and is in the same skill grouping as F-8(A), F-1(A), and Cp-4(A). The skill Cp-7(A), though in the same sorting slot, falls into another skill grouping. All skill groups are separated by the slash as indicated. Appendix D gives the entire listing of sorting slot data.

Table 4. Example of Sorting Slot Contents

Simple Judgment - ER/RP (Slots 41-60)			
Slot No.	**Basic Skill Groups**	**Slot No.**	**Basic Skill Groups**
41	Cp-6(E), Ct-1(H), Ct-1(L),	51	None
	Ct-5(F), Ct-5(K)/* Ct-5(R),	52	None
	Cp-8(G)/	53	F-5(A), F-6(A)
42	Cp-1(F)/ Cp-1(H)/ Cp-1(J)/	54	None
	Cp-8(D)	55	F-4(A)/ Cp-4(H)/ Cp-13(A)
43	None	56	Cp-5(A)/ Cp-8(A)
44	None	57	F-13(A), F-14(A)
45	Cp-13(J)/ Ct-1(K), Ct-7(K)	58	F-2(A), F-3(A), F-7(A),
46	None		F-9(A), F-10(A), F-12(A)
47	None	59	None
48	None	60	F-8(A), F-11(A), Cp-3(A),
49	Ct-2(B)		Cp-4(A)/ Cp-7(A)
50	Ct-3(C)		

* Slash (/) - Indicates Skill Grouping

Basic Application - The classification matrix development effort has provided a rationale for organizing flying tasks and skills into a taxonomic data system. Through a system of indexing and cross-indexing of tasks and skills, information may be retrieved at any level of classification and any place within the hierarchy. Researchers desiring to use the system need only have an understanding of the classification rules and a firm idea of what information they seek, relative to the skill behavior described by the surface analysis and classified by the rules. It is unnecessary for them to be experts with taxonomy concepts. At this point in the effort, a full set of directions for the use of the system has not been stated in specific terms. However, the mechanics for looking at tasks and skills independently appears to be complete.

OPERATIONS WITHIN THE TAXONOMIC MATRIX

The primary classification matrix provided an efficient and powerful analytical tool for the investigation of the taxonomy. Through various applications of the classification rules, the researcher can obtain informational requirements in a most efficient manner. Described in this section are the overall trends of the classification. In the following paragraphs, specific examples are provided to show how the matrix operates and how it can be used to meet a variety of research needs in flying training.

General Trends - The taxonomy analyzed fourteen fundamental, thirteen composite and seven continuous tasks. Within these tasks, three-hundred-and-seven elemental task sequences were classified. It should be remembered that in classification, each task sequence yielded one data card. Of these three-hundred-and-seven cards, 22% were from fundamental tasks, 45% from composite tasks, and 33% from continuous tasks. Of these cards, twenty-eight were unprocessable because the task structuring forced the final task element of each maneuver to be incomplete.

The classification matrix consisted of one-hundred-eighty slots into which the data cards could be placed. Only 41%, or seventy-four of one-hundred-eighty slots, were used (i.e. contained one or more cards). As the possible number of active slots was reduced by over half, a basic trend towards simplicity became evident. This trend was further reinforced when it was noted that the cards clustered in well defined groups, giving a firm indication of very orderly data. Table 2 illustrates the clustering of slots which contain a maximum number of cards in a specific area of the matrix.

The orderliness of the data was also shown by the trends in skill coding going from the comparatively easy fundamental tasks through the more difficult continuous tasks and finally to the most difficult composite tasks. Table 5 shows a majority of cards in the fundamental tasks established attitude, an easy operation, as compared to a majority of the continuous and composite tasks establishing a rate of attitude change. A trend away from simple judgments to complex judgments was found in the composite and continuous tasks. In the mental action categories, the majority of the task elements in all groups required multi-cue processing. The number of other mental action categories increased in the composite and continuous tasks over those found in the fundamentals.

Table 5. Basic Taxonomic Information

FUNDAMENTAL TRANSITIONAL TASKS F-1 thru F-14 (Total of 70 Skills)

SIMPLE JUDGMENT 47			
ESTABLISH ATTITUDE 34		ESTAB. RATE OF ATT. CHANGE 13	
Multi-Cue Process 33	Recall Process 1	Multi-Cue Process 13	Recall Process 0
Spec. Cue Process 0	Iterative Process 0	Spec. Cue Process 0	Iterative Process 0

COMPLEX JUDGMENT 23			
ESTABLISH ATTITUDE 9		ESTAB. RATE OF ATT. CHANGE 14	
Multi-Cue Process 8	Recall Process 1	Multi-Cue Process 14	Recall Process 0
Spec. Cue Process 0	Iterative Process 0	Spec. Cue Process 0	Iterative Process 0

COMPOSITE TRANSITIONAL TASKS Cp-1 thru Cp-13 (Total of 139 Skills)

SIMPLE JUDGMENT 86			
ESTABLISH ATTITUDE 42		ESTAB. RATE OF ATT. CHANGE 44	
Multi-Cue Process 27	Recall Process 11	Multi-Cue Process 25	Recall Process 14
Spec. Cue Process 2	Iterative Process 2	Spec. Cue Process 4	Iterative Process 1

COMPLEX JUDGMENT 53			
ESTABLISH ATTITUDE 16		ESTAB. RATE OF ATT. CHANGE 37	
Multi-Cue Process 13	Recall Process 2	Multi-Cue Process 33	Recall Process 4
Spec. Cue Process 0	Iterative Process 1	Spec. Cue Process 0	Iterative Process 0

CONTINUOUS TRANSITIONAL TASKS Ct-1 thru Ct-7 (Total of 98 Skills)

SIMPLE JUDGMENT 45			
ESTABLISH ATTITUDE 15		ESTAB. RATE OF ATT. CHANGE 30	
Multi-Cue Process 12	Recall Process 2	Multi-Cue Process 10	Recall Process 11
Spec. Cue Process 1	Iterative Process 0	Spec. Cue Process 8	Iterative Process 1

COMPLEX JUDGMENT 53			
ESTABLISH ATTITUDE 3		ESTAB. RATE OF ATT. CHANGE 50	
Multi-Cue Process 3	Recall Process 0	Multi-Cue Process 32	Recall Process 18
Spec. Cue Process 0	Iterative Process 0	Spec. Cue Process 0	Iterative Process 0

Another analysis based on the number of cards within slots indicated data organization. A graph of the number of slots filled with a given number of cards as illustrated in Figure 7 showed that 35% of the slots had one card, while the remainder had two or more cards. The 35% figure was unusual as an apparently large group of unrelated cards would seem to counter a simplistic orderly analysis. However, this was not the case. In fact, these items accounted for only a small part of the total number of cards (about 9%). This, plus their infrequent use in flying permitted the elimination of the one card skill category from further analysis. Operation of flap, wheel brake, speed brake, and nose wheel steering are examples of the skills eliminated because of their relatively infrequent occurrence. When this was done, forty-seven slots were required for the remaining two-hundred-eighty-one cards.

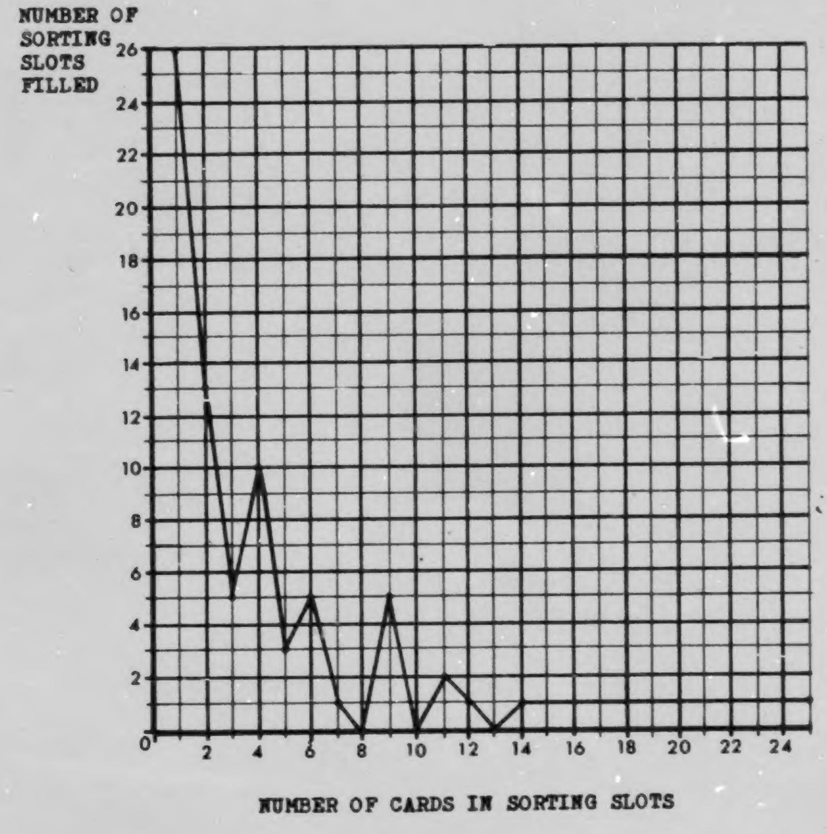


Figure 7. Skill Card Distribution

It is important to remember that a key part of the taxonomy definition was the establishment of a useful relationship. Such a relationship has been established and the logical simplicity of data further provided a rational description of flying skills. With such a description, a remodeling of current thinking and procedures will be possible for flight training personnel.

General Evaluation - An important use of the taxonomy was the examination of individual sorting slots within the matrix sub-block. Each slot was uniquely identified by the particular combination of behavioral elements it contained. This combination of behavioral elements was the necessary skill group used to perform the task sequences from which it was derived. It was apparent that a sorting slot that contained only one card identified a skill group of small utility required for only one task sequence analyzed. A sorting slot which contained numerous cards identified a skill group or groups that were necessary for the performance of a variety of task seuences. The cards identified those task sequences which required the skill groups needed as a part of fundamental, composite or continuous transitional tasks. This type of examination identified which skill groups were associated with which types of tasks or task combinations. This kind of information should provide the learning specialist with basic information necessary to undertake the development of a training program, based on skill requirements instead of a maneuver oriented program.

The following are two examples of the sorting slot investigation. In the first example, every card or skill in the slot is identical. The skills have the following characteristics:

Slot 145

Complex Judgment
Establish Rate of Attitude Change
Multi-Cue Processing
4 Cue Complexity
Rank 5 Motor Action Complexity
Level 4 Mental Action Complexity
10 Total Cue Inputs
Control Output - Coordinates Aileron, Rudder and Elevator

The types of tasks and task elements found in this slot are listed as follows. Note that only composite and continuous tasks are found indicating a relatively complex task.

Task Element	Task	Task Type
Cp - 1 (G)	Take off and Climb	Composite
Cp - 2 (B)	360° Overhead Approach	
Cp - 2 (C)	" " "	
Cp - 2 (F)	" " "	
Cp - 2 (L)	" " "	
Cp - 2 (O)	" " "	
Cp - 7 (B)	Stall (Accelerated)	
Cp - 7 (C)	" "	
Ct - 2 (H)	Barrel Roll	Continuous
Ct - 7 (I)	Vertical Recovery	

As previously discussed each card in a sorting slot need not be identical. All cards that are identical are said to be contained in a skill group. Differences within a sorting slot may be found in mental action/complexity, number of total cue inputs, or specific control output categories. These categories may be used as additional grouping categories if a more detailed analysis of the skill components is required by the training specialists. Such a sorting is found in Slot 141.

Slot 141 Characteristics

	Simple Judgment
	Establish Rate of Attitude Change
	Recall Memory Processing
	4 Cue Complexity
	Rank 1 Motor Action Complexity
	Level 2 Mental Action Complexity
Skill Group I	8 Total Cue Inputs Control Output - Elevator
Skill Group II	More than 8 Total Cue Inputs Control Output - Rudder

Task Element	Task	Task Type	Skill Group
Cp - 6 (E)	Stall (Departure)	Composite	I
Cp - 8 (G)	Spin Recovery	"	II
Ct - 5 (K)	Cuban 8	Continuous	II
Ct - 5 (F)	"	"	I
Ct - 5 (R)	"	"	I
Ct - 1 (H)	Loop	"	I
Ct - 1 (L)	"	"	I

Horizontal Sort - All of the operations with the taxonomy described thus far have been concerned with particular sorting slots. These operations have been arrived at by the sequential application of the rules to a given task sequence. This arrangement may be thought of as a sequential or vertical sorting procedure in which each successive category is uniquely defined by application of the rules.

It is possible, however, to assemble information on all task elements that have identical categories at a given level without regard to category information at other levels. This is called a horizontal sort. For example, if one wanted to group all the task sequences that involved memory recall processing, cards would be collected in all the sorting slots under memory recall processing. These are slots 1-20, 41-60, 81-100, 121-140 of the matrix. This horizontal sorting procedure allows the training specialist to identify all of the task sequences that involve a specific behavioral element that he wants to investigate.

Available horizontal sorting categories are shown in Figure 8. The specific slots which are included for each category are identified in Appendix E.

It should be noted that the iterative processing and specific cue processing categories are not sub-divided below the cues/complexity level in this taxonomic matrix. Thus, if a horizontal sort were undertaken below the cues/complexity level, it would be necessary to individually inspect each card in the iterative processing and specific cue processing sorting slots to complete the procedure.

Potential Uses of the Taxonomic Format - The basic structure of the taxonomic matrix will provide the learning specialist with a powerful tool for the exploration of basic content requirements for training programs.

It should also be possible to apply the taxonomic rules, with only slight adaptation, to any task analysis of operational flying mission segments. The results of such a project could be used to determine if the skills needed for operational flying were being taught in the Undergraduate Pilot Training Program, and to identify those skill requirements which perhaps should be considered.

Another potential application of the taxonomic format would be in the area of training device development. With appropriate minor changes to the rules, it should be possible to identify specific cue requirements for performance of task sequences. This could be accomplished by sorting cues on specific cue types such as motion or visual rather than the number of cues as currently used.

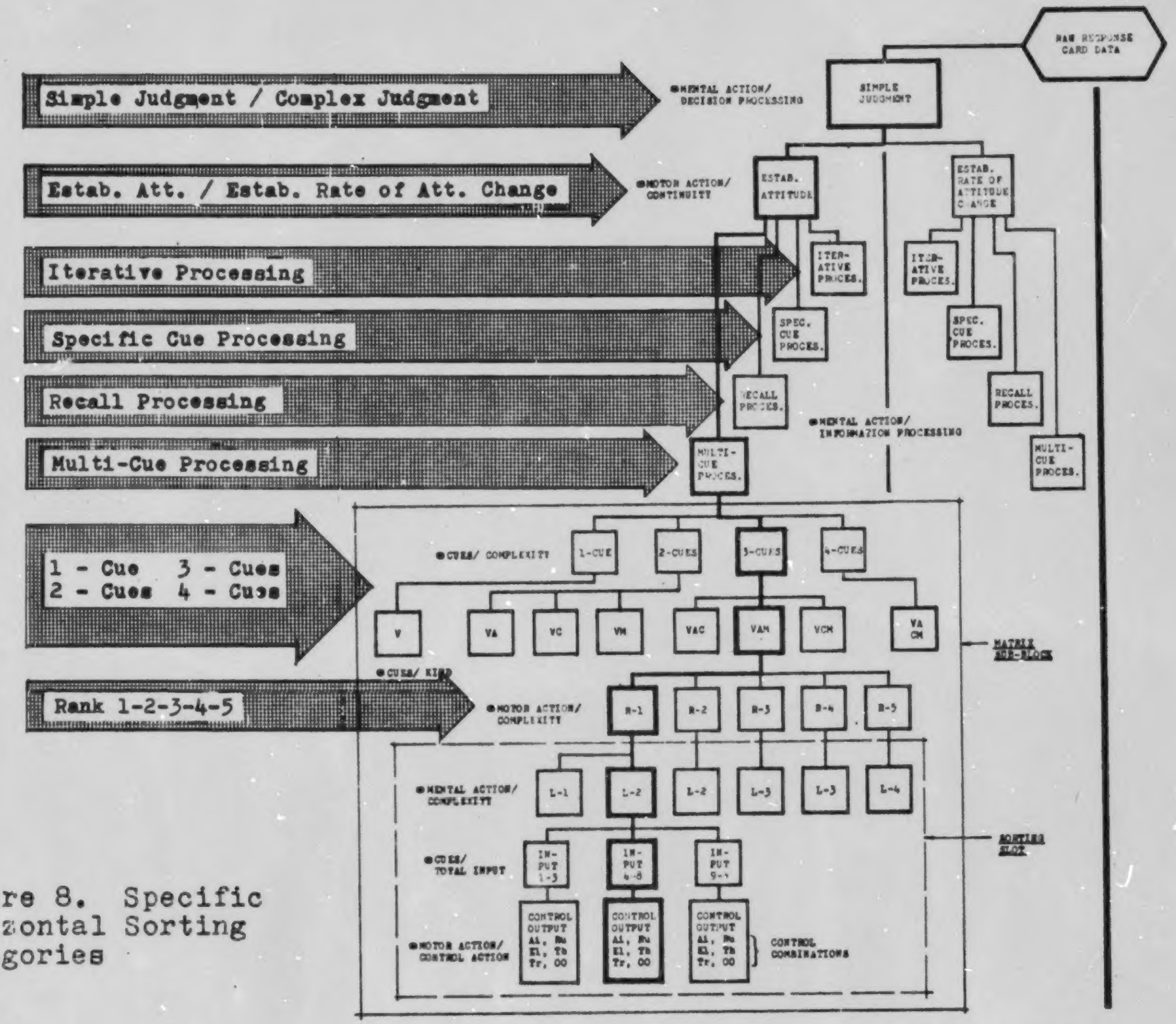

RAW RESPONSE CARD DATA
SIMPLE JUDGMENT
Simple Judgment / Complex Judgment
MENTAL ACTION/ DECISION PROCESSING
Estab. Att. / Estab. Rate of Att. Change
MOTOR ACTION/ CONTINUITY
ESTAB. ATTITUDE
ESTAB. RATE OF ATTITUDE CHANGE
Iterative Processing
ITER-ATIVE PROCES.
Specific Cue Processing
SPEC. CUE PROCES.
Recall Processing
RECALL PROCES.
MENTAL ACTION/ INFORMATION PROCESSING
Multi-Cue Processing
MULTI-CUE PROCES.
1 - Cue 3 - Cues
2 - Cues 4 - Cues
CUES/ COMPLEXITY
1-CUE
2-CUES
3-CUES
4-CUES
V
VA
VC
VM
VAC
VAM
VCM
VA CM
MATRIX SUB-BLOCK
CUES/ KIND
Rank 1-2-3-4-5
MOTOR ACTION/ COMPLEXITY
R-1
R-2
R-3
R-4
R-5
MENTAL ACTION/ COMPLEXITY
L-1
L-2
L-2
L-3
L-3
L-4
SORTING SLOT
CUES/ TOTAL INPUT
IN-PUT 1-3
IN-PUT 4-8
IN-PUT 9-
MOTOR ACTION/ CONTROL ACTION
CONTROL OUTPUT Al, Ru El, Th Tr, 00
CONTROL COMBINATIONS

Figure 8. Specific Horizontal Sorting Categories

Although these applications were not within the scope of the present effort, the inventive learning specialist should have no difficulty in developing many useful schemes to direct the application of the taxonomy for the improvement of future flying training programs.

GLOSSARY

Activates - the discrete engagement of a specific control such as a toggle switch in the surface analysis.

Adjusts - the incremental regulation of a specific control described in the surface analysis.

Anticipate - describes the mental state which is the precursor of subsequent motor action.

Attitude - the position of the aircraft considering the inclination of its axis in relation to the horizon.

Aural - cues or stimuli which can be sensed through hearing.

Bank - to tip, or roll about the longitudinal axis of the aircraft. (Banks are incidental to all properly executed turns.)

Basic Skill - a fundamentally learned series or forged element chain which can be triggered by a single set of cues or stimuli.

Basic Skill Group - the grouping of basic skills categorized within a specific sorting slot which exhibit the same properties.

Classification Hierarchy - the ranking or grading of the nine adopted classification rules in successive order based on both value judgments and empirical evaluation.

Classification Rules - the set of nine guidelines adopted in this study which were used to establish the behavioral element categories for the Cues, Mental Action and Motor Action components of the surface task analysis.

Classification Rules Instructions - the concise set of regulations which determined the application of each classification rule to information described in each task sequence with the surface analysis.

Climb - a state of flight in which the aircraft is increasing in altitude.

Composite Transitional Task - two or more fundamental transitional tasks combined to perform a more complex flying requirement. Composite transitional tasks have a Cp designator in the surface analysis.

Continuous Iterative Processing - the mental action thought of in terms of cyclic activity which occurs during the steady-state portion of a flying task.

Continuous Transitional Task - any number of fundamental transitional and specialized tasks combined in a rapid sequence to complete an aerobatic flying requirement. Continuous transitional tasks have a Ct designator in the surface analysis.

Control - a device used by a pilot in operating an airplane.

Control Feedback - cues or stimuli which can be sensed by body limbs or extremities through the control devices of the aircraft. The control feedback input has been shortened to Control in the cues column of the surface analysis.

Coordinate - the movement or use of two or more controls in their proper relationship to obtain a desired effect.

Coordinated Outputs - those control actions which were performed simultaneously in the Motor Action description of the surface task analysis.

Cue - environmental or system stimuli which excite the sensory systems of the human body.

Descend - a state of flight in which the aircraft is decreasing in altitude.

Determine - to reach a decision.

Effector Output - pilot Motor Action in terms of control exerted on the aircraft, (i.e. elevator movement resulting from control stick movement to change aircraft pitch attitude).

Flare Out - to decrease the rate of descent and airspeed by slowly raising the nose of the aircraft during landing.

Fundamental Transitional Task - one of the fourteen control segments derived from combinations of the four steady-state flight paths.

Glide - sustained forward flight at idle power in which airspeed is maintained only by loss of altitude.

Horizontal Sorting - the operation of examining task skills in the classification matrix at a given level without regard to the categories at other levels.

Intermediate Skill - a combination of two or more basic skills chained together to form a skill cluster.

Long Term Memory - information which was acquired prior to the performance of the skill.

Maintains - the continuation of a controlling pressure on an aircraft control described in the surface analysis.

Maneuver - any planned motion of the aircraft in the air or on the ground.

Maneuver Analysis Kit - the assembly of classification instructions, surface task analyses, and behavioral element categories into an organized folder to be used in the classification of task sequence information by validation subjects and project researchers.

Matrix Sub-Block - that portion of the classification matrix made up of twenty sorting slots which specifically categorized all skills with respect to Cue kind, complexity; and Motor Action complexity rules and provides the framework for the further isolation of skills into basic skill groups.

Memory Recall Processing - the mental action involving the recollection of procedures or facts about the performance of a task prior to performing it.

Mental Action - cognitive process initiated by perceived stimulus cues and preceding motor actions.

Motion - cues or stimuli which can be sensed by the body receptors as a result of aircraft movement.

Motor Action - those physical actions resulting in movement of aircraft controls.

Moves - the displacement of a control from a previous position as described in the surface analysis.

Multi-Cue Processing - the mental action concerned with problem solving and decision making, involving multiple cues and evaluation of potential action.

Non-Coordinated Outputs - those control actions which were performed sequentially in the Motor Action description of the surface task analysis. (Non-coordinated outputs should not be confused with "un-coordinated control" which generally carries the connotation of simultaneous outputs executed with improper technique.)

Observes - the selection of a dominant environmental or aircraft generated cue upon which a motor action is based.

Pitch - the angular displacement of the longitudinal axis of the aircraft with respect to the horizon.

Primary Classification Matrix Board - the board upon which the taxonomic hierarchical system of basic divisions, sub-blocks and sorting slot divisions was developed for the orderly categorization of classified skill information.

Procedural Skill - a cluster of intermediary skills strung together to form a repertoire of piloting capability.

Raw Data - Surface Analysis data which has been classified and coded into response card information.

Relaxes - the reduction of a controlling pressure on an aircraft control described in the surface analysis.

Response Card - the notation form designed to hold the coded basic skill information of an individual task sequence as determined by the behavioral element categories within the classification rules. The response card is also called a skill card in the text because of the coded basic skill information it contains.

Roll - displacement around the longitudinal axis of the aircraft.

Short Term Memory - information remembered which was obtained during the performance of a skill.

Skill - all behavior elements used in the performance of a task sequence.

Sorting Slot - the grouping area within the matrix sub-block which categorized skills with respect to Motor Action control and complexity, and Mental Action complexity, and isolated all skills into basic skill groups.

Specific Cue Processing - the mental action dealing with the perception and recognition of a specific cue and related to the use of short term memory storage.

Steady-State - flight situation when the dynamic forces are trimmed to allow essentially "hands off" flight.

Straight-and-Level - a state of flight in which the aircraft is in a constant heading at a constant altitude with wings in the same plane as the horizon.

Surface Analysis - a systematic description of an interaction between surface elements; i.e. cue and motor action and the depth element, mental action; as they relate to the environment, the criteria, and the system.

Sustains - the thought process which integrates the actions for the steady-state portions of a task or maneuver described in the surface analysis.

Task - a group of related work elements performed in close temporal proximity by one person and directed toward the accomplishment of a definable goal.

Task Element - the smallest part of the surface analysis which is expressed as a major input or action heading, i.e. Cues or Mental Actions or Motor Actions are task elements of the analysis.

Task Sequence - a complete set of interacting behavioral elements (i.e., Cues, Mental Action, and Motor Action) found in the surface analysis.

Taxonomy - a manner of classifying, and the rules and principles concerned with classification of phenomena in such a way that a more useful relationship can be established among them.

Transition - the activities required to change from one steady-state to another.

Trim - the balance of all dynamic forces of the aircraft so the aircraft can be flown essentially "hands off" the controls.

Turn - to create a change of direction of flight by causing the aircraft to roll about its longitudinal axis.

Vertical Sorting - the operation of examining task skills in the matrix by applying the classification hierarchy in a sequentially oriented procedure.

Visual - cues or stimuli which can be sensed by the eye.

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APPENDIX A

MANEUVER ANALYSIS KIT MATERIAL

INSTRUCTIONS

THE UNDERGRADUATE PILOT TRAINING
(UPT) MANEUVER ANALYSIS KIT

This study effort is being conducted for the U.S. Air Force Human Resources Laboratory, Williams AFB, by Design Plus of St. Louis, Missouri, under Contract No. F41609-73-C-0040.

INTRODUCTION

Flying is a profession quite familiar to you. There are however areas of flying which have not yet been fully researched. One such area is flying training. In the hour and fifteen minutes spent working with us, you will be helping us to classify and better understand certain flying maneuvers. In technical terms, we are dealing with a taxonomy or the science of classification. Through the use of a well defined set of rules, flight maneuvers will be organized into logical groups which will identify both the good and redundant parts of the UPT program.

You will be given a step-by-step task analysis of certain flying maneuvers and are asked to classify them based on a set of rules. To accomplish this job, you will examine each step in the maneuvers and write your interpretation on a Response Card. The resulting classification will be your personal input in helping to develop new and better flying programs which can make the complexities of flight more logical for the instructor to teach and easier for the student to learn.

TASK ANALYSIS FORMAT

Each of you has been given 3 separate analyses of flying tasks which are learned during the Undergraduate Pilot Training program. Two are very basic tasks while the other is more complex. The tasks in these analyses are not specific to either the T-37 or T-38, but rather focus on the general flying skills required in learning to fly.

Figure 1 is part of a typical Task Analysis which you are being asked to use as a basis for your classification work. At the top of the page, the SITUATION describes relevant flight information present before the task is begun. On line two, the TASK NO., or Task Number, contains an identifying letter and code number to keep track of the task during the study. As part of line two, the TASK is a description of the maneuver to be done. The TASK GOAL in line three states the outcome of the task. The major headings on line four begin with EL. SEQ., or Element Sequence. This column provides the coding system for noting each separate part of the task. CUES, MENTAL ACTION and MOTOR ACTION, the remaining major headings on line four are the elements in the Task Analysis you are being asked to classify.

CLASSIFICATION CODING SYSTEM

A coding system is necessary to record your classification of CUES, MENTAL ACTION and MOTOR ACTION elements for each skill in the flying tasks or maneuvers included in this kit.

On line two of the Task Analysis in Figure 1, the Task Number contains the letter identifier and code number to keep track of your response to this task during the study. The Element Sequence column provides the coding system for the notation of an entire sequence containing CUES, MENTAL ACTION and MOTOR ACTION by using a capital letter identifier in parenthesis. Each sequence element is listed in consecutive 1-2-3 order as shown in the figure. The coding system for specifying Behavioral Component Categories is shown in Fig. 2. All letter identifiers and number codes of the categories to be used in classification are shown underlined.

RESPONSE CARD COMPLETION

At the bottom is an example of a Response Card which has been completed using data from the Task Analysis in Figure 1. At the top left of the card is the Task Number which has been copied from the second line of the analysis. The capital (A) identifier next to the Task Number on the card is copied from the Element Sequence column. A Task Number and letter identifier must appear at the top of each Response Card. The coded information on lines 1-2-3 is determined by applying the classification rules to the Task Analysis.

In all cases, a response should be made, even if you are unsure of your interpretation. Whenever you are unsure of your response, place a small check mark in the block in addition to the response. Now take a response card and copy the data from the example on to it.

F-1(A)			
1	V	1-C	T-2
2	L-3	RP	SU
3	ER	AI RU EL	R-4

Example Response Card

CLASSIFICATION INSTRUCTIONS

1. Instructions for Cues Classification - Using Tables 1 and 2 enter the appropriate codes for cue classification in the blocks on line 1 of the Response Card.

First Block Across - List each kind of cue identified in the task sequence by its abbreviation. Do not list any cues described as Neutral or Normal in this block.

Second Block Across - Count the number of cues and write the appropriate number and code in the block.

Third Block Across - Read the Cue entry in the task sequence again. Notice that there may be more than one entry under each major kind of cue. Count each entry you find and write the appropriate number and code for the total input in this block.

2. Instructions for Mental Action Classification - Using Tables 1 and 2, enter the appropriate codes for Mental Action classification in the blocks on line 2 of the Response Card.

First Block Across - Note again the number of cues entered in block 2 of line 1. Now count the different control movements, pressures, and discrete actions in the Motor Action column of the task sequence of the Task Analysis.

*Enter L-1 for one cue with no control action.

*Enter L-2 for one or more cues with one or more non-coordinated control actions.

*Enter L-3 for one or more cues with coordinated control actions.

*Enter L-4 for two or more cues with coordinated and non-coordinated control actions.

Second Block Across - Read the entry in the Mental Action column of the task sequence. Each behavioral entry will begin with one of the words listed below at the left:

MENTAL ACTION INFORMATION PROCESSING

Observes.......enter.....Specific Cue Processing...SC

Anticipates....enter.....Memory Recall Processing..RP

Determines.....enter.....Multi-Cue Processing......MC

Sustains.......enter.....Iterative Processing......IP

Write the appropriate corresponding code indicated above in this block.

Third Block Across - Read the entry in the Mental Action column of the task sequence again. Determine if the action is a Simple Judgment SJ or a Complex Judgment CJ.

*Simple Judgment SJ - A decision for a motor action based on a specific cue or the specific recall of facts and procedures. (Example - The use of a specific reference such as an instrument value or ground position point at which to perform an action.)

*Complex Judgment CJ - A decision for a motor action estimated from the interpretation of cues and the interpretive recall of facts and procedures. (Example - Estimating when an action such as the roll out on the final turn should be performed.)

3. Instructions for Motor Action Classification - Again using Tables 1 and 2, enter the appropriate codes for the motor action classification in the blocks on line 3 of the Response Card.

First Block Across - Read the entry in the Motor Action column of this task sequence, then drop down and read the cues in the next sequence of the analysis. Determine if the cues and action establishes a specific aircraft attitude or rate of attitude change. List either the EA code for Establish Attitude or the ER code for Establish Rate of Attitude Change in this block according to the following:

*Establish Attitude EA - The condition in which the motor action produces stable (non-moving) pitch and bank cues. (Example - The stabilized pitch and bank attitude in an established turn.)

*Establish Rate of Attitude Change ER - The condition in which either a pitch or bank cue, or pitch and bank cues are moving continuously. (Example - The continuous pitch and bank movements present when going into a turn.)

Second Block Across - Read the Motor Action entry in the task sequence and list all the control outputs by writing the abbreviation of the control effected such as AI for Aileron or RU for Rudder in this block. Note also that a group of control outputs are grouped under the abbreviation OO.

Third Block Across - Count the number of control outputs listed in the second block, then qualify and rank them as follows:

1st. Rank........One output

2nd. Rank........Two or more non-coordinated outputs

3rd. Rank........Two coordinated outputs

4th. Rank........Three coordinated outputs

5th. Rank........More than three coordinated outputs

6th. Rank........Two or more coordinated outputs with non-coordinated output(s)

Write the appropriate corresponding number and code in this block.

This completes a classification of one task sequence. Now use these rules and the Behavioral Category Coding System in Table 2 in order to complete the Response Cards for the remaining task sequences in this kit.

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-1 **TASK** Straight and level/transition to coordinated constant altitude turn (60° bank)

TASK GOAL To establish constant bank level turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS TURN		
1.	Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral pres. Motion-Normal G		
2.		Anticipates transition to 60° bank turn	
3.			Coordinates aileron, rudder and elevator
(B)	STARTS ROLL		
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Positive G onset, rolling, pitching up		
2.		Determines satisfactory roll rate & need for power	
3.			Maintains coordinated aileron & rudder pres; increases elevator pres. & adjusts throt.
(C)	CONTINUES ROLL		
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Constant aileron & rudder pres., increased elevator pres, throttle adv. Motion-Increasing pos. G, rolling, pitching up		

Table 1 Typical Task Analysis Format

1.	CUES		
KIND	COMPLEXITY	TOTAL INPUTS	
Visual.........V	1-Cue........1-C	T-1	T-5
Aural..........A	2-Cues.......2-C	T-2	T-6
Control........C	3-Cues.......3-C	T-3	T-7
Motion.........M	4-Cues.......4-C	T-4	T-8...etc.

2.	MENTAL ACTION	
COMPLEXITY	INFORMATION PROCESSING	DECISION PROCESSING
1st. Level....L-1	Specific Cue Processing....SC	Simple Judgement......SJ
2nd. Level....L-2	Memory Recall Processing....RP	
3rd. Level....L-3	Multi-Cue Processing....MC	Complex Judgement......CJ
4th. Level....L-4	Iterative Processing....IP	

3.	MOTOR ACTION	
CONTINUITY	CONTROL OUTPUT	COMPLEXITY
Establish Attitude.....EA	Aileron..........AI	1st. Rank.......R-1
	Elevator.........EL	2nd. Rank.......R-2
	Rudder...........RU	3rd. Rank.......R-3
Establish Rate of Attitude Change.......ER	Throttle.........TH	4th. Rank.......R-4
	Trim.............TR	5th. Rank.......R-5
	Other Outputs....OO Speed Brakes - Gear Wheel Brakes - Flaps	

Table 2 Behavioral Element Categories and Coding System

THE UNDERGRADUATE PILOT TRAINING
(UPT) MANEUVER ANALYSIS KIT

TASK NO. F-2

TASK Straight and level flight/transition to straight ahead climb

GOAL To establish constant speed climb

THE UNDERGRADUATE PILOT TRAINING (UPT) MANEUVER ANALYSIS KIT

TASK NO. Cp-2

TASK 360° overhead landing

TASK GOAL Landing the aircraft

APPENDIX B

VALIDATION DATA

ANALYSIS KIT QUESTIONNAIRE

Age __________ Pilot Experience:

Military Pilot __________
Private Pilot __________
Commercial Pilot __________

1. Were the instructions in the analysis kit clear? __________
2. If not, where were they unclear? __________
3. Did you have a problem with any of the Classification Rules? __________
4. With which Rules did you have a problem? Give details below:
   Rules for 1. __________
   Rules for 2. __________
   Rules for 3. __________
5. Did you have a problem with any of the task sequesnces? ____
   If yes, state your problem by task sequence __________
6. How long did it take you to complete the Classification? __________
7. Did you consider the Classification a complex job? __________
   If yes, why? __________

REMARKS: __________

Validation Research Information

Participation Breakdown

USAF Line Instructor Pilots	4
USAF Instructor Pilots working with HRL	2
USAF Student Pilots	4
Ex-Military Pilot working with HRL	1
Non-Pilot with HRL	1
Total Subjects	12

Non-Completion

USAF Line Instructor Pilots	2
USAF Student Pilots	1
Total Non-Completions	3

Total Subjects Participating in the Validation Research	9

QUESTIONNAIRE RESPONSE BREAKDOWN

1. Were instructions clear? Yes 6 No 5 No Response 1

2. Where unclear? Complex 3, Confusing 2, Incomplete 1

3. Problems with rules? Yes 8 No 4

4. Which rules?

Decision Processing (Mental Action)	3
Continuity (Motor Action)	3
Complexity (Motor Action)	2
Complexity (Mental Action)	3

5. Problem with task sequences? Yes 2* No 7
   *Difficult to break down or application of personal standards

6. Average completion time of those who completed - 2 hours.
   (Range 1-3/4 hours to 2½ hours)

7. Was classification a complex job? Yes 4 No 3 Moderately 2
   Reasons for complexity (comments)
   1. Read too much into tasks and rules - 1.
   2. Much information to process - 1.
   3. Unfamiliarity - 3.
   4. Sequencing not logical - 2.

Remarks: (5 out of 9 participants had remarks)
1. Classification only confusing at first.
2. Didn't understand why it was done.
3. Format could be improved.
4. More work to make things clearer.
5. Wondered about cues and mental process.
6. Tasks should be a little more precise.

Analysis Validation Agreement

FUNDAMENTAL TRANSITIONAL TASK- Straight and Level transition to climb									
TASK and SKILLS	CUES			MENTAL ACTION			MOTOR ACTION		
	Kind	Comp-lexity	Total Input	Comp-lexity	Info Proces	Decis. Proces	Con-tin'ty	Control Output	Comp-lexity
F-2 (A)	7*	7	7	5	7	6	8	8	7
(B)	9	9	8	4	9	7	7	9	7
(C)	8	8	7	5	8	7	5	7	5
(D)	9	9	6	7	9	8	9	7	7
(E)	9	9	6	7	7	8	8	9	7
TOTAL	42	42	34	28	40	36	37	40	33
AVERAGE	8.4	8.4	6.8	5.6	8.0	7.2	7.4	8.0	6.6
% AGREE	93	93	76	62	89	80	82	89	73

* 9 is a 100% Agreement

COMPOSITE TRANSITIONAL TASK- 360° Overhead Approach and Landing									
TASK and SKILLS	CUES			MENTAL ACTION			MOTOR ACTION		
	Kind	Comp-lexity	Total Input	Comp-lexity	Info Proces	Decis. Proces	Con-tin'ty	Control Output	Comp-lexity
Cp-2(A)	9	9	4	3	8	6	9	9	6
(B)	9	8	5	7	9	9	9	9	5
(C)	8	8	6	6	9	7	9	9	7
(D)	6	6	3	4	9	7	5	9	7
(E)	8	8	7	5	9	9	8	9	8
(F)	8	8	7	6	9	9	9	9	8
(G)	8	8	6	7	9	8	8	9	8

Analysis Validation Agreement (contd)

Cp-2 (H)	7	7	3	8	9	6	6	9	9
(I)	7	7	3	7	9	7	7	9	9
(J)	7	7	4	7	9	5	7	9	9
(K)	7	7	3	8	9	7	7	9	9
(L)	8	8	3	9	9	9	7	8	9
(M)	6	6	4	7	9	8	7	9	8
(N)	7	7	4	6	7	9	9	9	8
(O)	7	7	4	8	9	9	8	9	9
(P)	7	7	4	7	7	6	5	9	8
(Q)	7	7	4	7	7	6	7	9	9
(R)	9	9	5	7	9	6	6	9	9
(S)	7	7	3	8	9	9	9	9	9
(T)	7	7	4	8	8	8	7	9	9
(U)	7	7	3	7	9	8	7	8	9
(V)	7	7	4	8	9	7	5	8	9
(W)	8	8	4	5	8	5	7	8	8
TOTAL	171	170	97	155	198	170	168	203	189
AVERAGE	7.4	7.4	4.2	6.7	8.6	7.4	7.3	8.8	8.2
% AGREE	83	83	47	75	96	82	81	98	91

ACCUMULATIVE INFORMATION

% of agreement-composite survey cards with researchers standard cards..................................86%

% of overall agreement in Task F-2..........................82%

% of overall agreement in Task Cp-2.........................82%

APPENDIX C

SURFACE TASK ANALYSES

Task Numbering List

Fundamental Transitions

F-1 St & L → T
F-2 St & L → C
F-3 St & L → D
F-4 T → St & L
F-5 T → C
F-6 T → D
F-7 C → St & L
F-8 C → T
F-9 C → D
F-10 D → St & L
F-11 D → T
F-12 D → C
F-13 St & L/Cruise → Low Cruise
F-14 St & L/Low Cruise → Cruise

St & L-Straight & Level, C-Climb, D-Descend, T-Turn

Composite Transitions

Cp-1	Take off & Climbout
Cp-2	360° Circling, Approach & Landing
Cp-3	Chandelle
Cp-4	Lazy-8
Cp-5	Stall - Approach to Landing
Cp-6	Stall - Departure or Takeoff
Cp-7	Stall - Accelerated/High Speed
Cp-8	Spin Recovery
Cp-9	Formation - Straight & Level
Cp-10	Formation - Turn away from Wingman
Cp-11	Formation - Turn into Wingman
Cp-12	Formation - Cross Under
Cp-13	Formation - Rejoin

Continuous Transitions

Ct-1	Loop
Ct-2	Barrel Roll
Ct-3	Aileron Roll
Ct-4	Clover Leaf
Ct-5	Cuban 8
Ct-6	Immelmann
Ct-7	Vertical Recovery

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-1 TASK Straight and level/transition to coordinated constant altitude turn (60° bank)

TASK GOAL To establish constant bank level turn DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS TURN		F-1 (A) 20. 1 | V | 1-C | T-2 2 | L-4 | RP | SJ 3 | EA | AL RU } / EL | R-5
1.	Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral pres. Motion-Normal G		
2.		Anticipates transition to 60° bank turn	
3.			Coordinates aileron & rudder, increases elevator pressure
(B)	STARTS ROLL		F-1 (B) 150. 1 | V CM | 3-C | T-8 2 | L-4 | MC | CJ 3 | ER | AL RU } / EL TH | R-5
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Positive G onset, rolling, pitching up		
2.		Determines satisfactory roll rate & need for power	
3.			Maintains coordinated aileron & rudder pres; increases elevator pres. & adjusts throt.
(C)	CONTINUES ROLL		F-1 (C) 105 1 | VA CM | 4-C | T-11 2 | L-4 | MC | CJ 3 | EA | AL RU } / EL | R-5
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Constant aileron & rudder pres., increased elevator pres, throttle adv. Motion-Increasing pos. G, rolling, pitching up		

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-1 **TASK** Straight and level/transition to coordinated constant altitude turn (60° bank)

TASK GOAL To establish constant bank level turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES ROLL		
2.		Determines proper bank attitude approaching	
3.			Coordinates aileron and rudder, and maintains elevator pressure
(D)	STOPS ROLL		F-1 (D) 27 1 V CM · 3-C · T-7 2 L-2 · MC · SJ 3 EA · TH EL · R-2
1.	Visual-Pitch att: nose high Bank att: constant Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron & rudder pres. & constant elevator pres. Motion-Constant positive G, rolling stabilized, pitching stabilized		
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pres.
(E)	ESTABLISHES STEADY STATE		F-1 (E) 0. 1 V M · 2-C · T-4 2 L-1 · MC · SJ 3 EA · — · —
1.	Visual-Pitch att: nose high Bank att: constant Instr. cross-check Aural-Normal envir. sound Control-Neutral stick & rudder pressure Motion-Constant positive G		
2.		Determines goal established.	
3.			Maintains turn control

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-2 **TASK** Straight and level flight/transition to straight ahead climb

TASK GOAL To establish constant speed climb **DATE** Oct., 1973

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(A)</td><td>BEGINS CLIMB</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: cruise
Bank att: level
Aural-Normal envir. sound
Control-Neutral pressure
Motion-Normal G</td><td></td><td>F2 (A) 58<table><tr><td>1</td><td>V</td><td>1-C</td><td>T-2</td></tr><tr><td>2</td><td>L3</td><td>RP</td><td>ST</td></tr><tr><td>3</td><td>ER</td><td>EL
TH</td><td>R-3</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates transition to climb</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates elevator & throttle adjustment</td></tr>
<tr><td>(B)</td><td>STARTS PITCH INCREASE</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att:increasing
Bank att: level
Instr. cross-check
Aural-Change in envir. sound
Control-Increased stick pressure & throttle advance
Motion-Positive G onset, pitching up</td><td></td><td>F2 (B) 142<table><tr><td>1</td><td>VA
CM</td><td>4-C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL
TH</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines satisfactory pitch attitude movement</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains constant elevator pressure & continues throttle adjustment</td></tr>
<tr><td>(C)</td><td>CONTINUES PITCH INCREASE</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: increasing
Bank att: level
Instr. cross-check
Aural-Change in envir. sound
Control-Constant stick pressure & throttle advance
Motion-Increasing positive G, pitching up</td><td></td><td>F2 (C) 102<table><tr><td>1</td><td>VA
CM</td><td>AC</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>EA</td><td>EL
TH</td><td>R-2</td></tr></table></td></tr>
</table>

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. 1-2 TASK Straight and level flight/transition to straight ahead climb

TASK GOAL To establish constant speed climb DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH INCREASE		
2.		Determines climb attitude approaching	
3.			Relaxes elevator, & stops throttle adjustment
(D)	STOPS PITCH INCREASE		F2(D) 27
1.	Visual-Pitch att: climb Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Decreased stick pressure Motion-Decreasing positive G, pitch stabilized		1 V CM 3-C T-6 2 L-2 MC SJ 3 EA TR EL R-2
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pressure
(E)	ESTABLISHES STEADY STATE		F-2 (E) 0
1.	Visual-Pitch att: climb Bank att: level Aural-Normal envir. sound Control-Neutral stick pressure Motion-Normal G		1 V 1-C T-2 2 L-1 MC ST 3 EA — —
2.		Determines goal established.	
3.			Maintains climb control

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-3 TASK Straight and level flight/ transition to straight ahead cruise descent

TASK GOAL To establish constant speed straight ahead descent DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS DESCENT Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		F-3 (A) 58 1 V 1C T-2 2 L-3 RP SJ 3 ER EL TH} R-3
2.		Anticipates transition to constant speed descent	
3.			Coordinates elevator & throttle adjust.
(B) 1.	STARTS PITCH DECREASE Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in env. sound Control-Increased stick pressure & throttle reduction Motion-Negative G onset, pitching down		F3 (B) 142 1 VA CM 4C T-8 2 L-2 MC CJ 3 ER EL TH R-2
2.		Determines satisfactory pitch attitude movement	
3.			Maintains constant elevator pressure & continuous throttle adjustment
(C) 1.	CONTINUES PITCH DECREASE Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in env. sound Control-Constant stick pressure & throttle reduction Motion-Constant negative G, pitching down		F3 (C) 102 1 VA CM 4C T-8 2 L-2 MC CJ 3 EA EL TH R-2

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-3 TASK Straight and level flight/ transition to straight ahead cruise descent

TASK GOAL To establish constant speed straight ahead descent DATE Oct., 1972

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH DECREASE		
2.		Determines descent attitude approaching	
3.			Relaxes elevator pressure & stops throttle adjust.
(D)	STOPS PITCH DECREASE		F-3 (D) 27. 1 · V CM · 3-C · T-6 2 · L-2 · MC · SJ 3 · EA · TR EL · R-2
1.	Visual-Pitch att: descent Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Decreased stick pressure Motion-Decreasing negative G, pitch stabilized		
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator press.
(E)	ESTABLISHES STEADY-STATE		F-3 (E) 0. 1 · V · 1-C · T-2 2 · L-1 · MC · SJ 3 · EA · — · —
1.	Visual-Pitch att: descent Bank att: level Aural-Normal envir. sound Control-Neutral stick pressure Motion-Normal G		
2.		Determines goal is established	
3.			Maintains descent control

SITUATION Aircraft in 60° bank, constant altitude, constant speed turn

TASK NO. F-4 **TASK** 60° bank turn transition to wings level flight

TASK GOAL To establish straight and level flight from a turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS ROLL OUT		
1.	Visual-Pitch att: nose high Bank att: constant Aural-Normal envir. sound Control-Neutral stick pres. Motion-Constant positive G		F4 (A) 55 1 VM 2-C T-3 2 L-4 RP SJ 3 ER AI RU EL R-5
2.		Anticipates rolling out of turn	
3.			Coordinates aileron & rudder, increases elevator pressure
(B)	STARTS ROLL		
1.	Visual-Pitch att: decreasing Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Decreasing positive G pitching down, rolling		F4 (B) 150 1 V CM 3-C T-8 2 L-4 MC CJ 3 EC AI RU EL TH R-5
2.		Determines satis. roll rate & need to reduce power	
3.			Maintains coordinated aileron & rudder pressure, reduces elevator pres. & adjusts throttle
(C)	CONTINUES ROLL		
1.	Visual-Pitch att: decreasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Constant aileron & rudder pressure, increased elevator pres. & throttle reduction		F4(C) 22 1 VA CM 4C T-10 2 L-2 MC SJ 3 EA AI EL RU R-2

SITUATION Aircraft in 60° bank, constant altitude, constant speed turn

TASK NO. F-4 **TASK** 60° bank turn transition to wings level flight

TASK GOAL To establish straight and level flight from a turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES ROLL Motion-Decreasing positive G, pitching down, rolling		
2.		Determines approaching wings level	
3.			Moves aileron, relaxes rudder & maintains elevator pres.
(D) 1.	STOPS ROLL Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron & rudder pressure, constant elevator pressure Motion-Normal G, pitch stabilized, roll stab.		F4 (D) 27. 1 V CM 3-C T-6 2 L-2 MC SJ 3 EL TR EL R-2
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pressure
(E) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral stick & rudder pressure Motion-Normal G		F4 (E) 0. 1 V 1-C T-2 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft in 60° bank, constant altitude, constant speed turn

TASK NO. F-5 **TASK** 60° bank, constant altitude turn transition to climb

TASK GOAL To establish climbing turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS CLIMB Visual-Pitch att: nose high Bank att:constant 60° Aural-Normal envir. sound Control-Neutral pressure Motion-Positive G		F5 (A) 53. 1 V M 2-C T-3 2 L-3 RP SJ 3 ER EL TH S R-5
2.		Anticipates transition to climb	
3.			Coordinates elevator & throttle adjust.
(B) 1.	STARTS PITCH INCREASE Visual-Pitch att:increasing Bank att:constant 60° Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure & throttle adv. Motion-Increasing positive G, pitching up		F-5 (B) 102. 1 VA CM 4-C T-8 2 L-2 MC CJ 3 EA EL TH R-2
2.		Determines satisfactory pitch attitude movement	
3.			Maintains constant elevator pressure & continues throttle adjustment
(C) 1.	CONTINUES PITCH INCREASE Visual-Pitch att:increasing Bank att:constant 60° Instr. cross-check Aural-Change in envir. sound Control-Constant stick pressure & throttle adv. Motion-Constant positive G, pitching up		F5 (C) 142. 1 VA CM 4-C T-8 2 L-2 MC CJ 3 EA EL TH R-2
2.		Determines climb attitude approach.	

SITUATION Aircraft in 60° bank, constant altitude, constant speed turn

TASK NO. F-5 **TASK** 60° bank, constant altitude turn transition to climb

TASK GOAL To establish climbing turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C) 3.	CONTINUES PITCH INCREASE		Relaxes elevator & stops throttle adjustment
(D) 1.	STOPS PITCH INCREASE Visual-Pitch att: climb Bank att: constant Instr. cross-check Aural-Normal envir. sound Control-Decreased stick pressure Motion-Decreasing positive G, pitch stabilized		F-5 (D) 27. 1 V CM · 5-C · T-6 2 L-2 · MC · SJ 3 EA · TR EL · R-2
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pressure
(E) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: climb Bank att: constant Aural-Normal envir. sound Control-Neutral stick pres. Motion-Constant positive G		F-5 (E) 0 1 V M · 2-C · T-3 2 L-1 · MC · SJ 3 EA · — · —
2.		Determines goal is established	
3.			Maintains climb control

SITUATION Aircraft in 60° bank, constant altitude, constant speed turn

TASK NO. F-6 **TASK** 60° bank, constant altitude turn, transition to cruise descent

TASK GOAL To establish descending turn from level turn **DATE** Oct., 1973

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(A)
1.</td><td>BEGINS DESCENT
Visual-Pitch att: nose high
Bank att:constant 60°
Aural-Normal envir. sound
Control-Neutral pressure
Motion-Positive G</td><td></td><td><table><tr><th colspan="3">F-6 (A)</th><th>53</th></tr><tr><td>1</td><td>V
M</td><td>2-C</td><td>T-3</td></tr><tr><td>2</td><td>L-3</td><td>RP</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL
TH }</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates transition to constant speed descent</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates elevator & throttle adjust.</td></tr>
<tr><td>(B)
1.</td><td>STARTS PITCH DECREASE
Visual-Pitch att:decreasing
Bank att:constant 60°
Instr. cross-check
Aural-Change in envir. sound
Control-Increased stick pres.
& throttle reduction
Motion-Decreasing positive G,
pitching down</td><td></td><td><table><tr><th colspan="3">F-6 (B)</th><th>142</th></tr><tr><td>1</td><td>VA
CM</td><td>4C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL
TH</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines satisfactory pitch attitude movement</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains constant elevator pressure & continues throttle adjustment</td></tr>
<tr><td>(C)
1.</td><td>CONTINUES PITCH DECREASE
Visual-Pitch att:decreasing
Bank att:constant 60°
Instr. cross-check
Aural-Change in envir. sound
Control-Constant stick pres.
& throttle reduction
Motion-Decreasing positive G,
pitching down</td><td></td><td><table><tr><th colspan="3">F-6 (C)</th><th>102</th></tr><tr><td>1</td><td>VA
CM</td><td>4-C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>EA</td><td>EL
TH</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines descent attitude approach.</td><td></td></tr>
</table>

SITUATION Aircraft in 60° bank, constant altitude, constant speed turn

TASK NO. F-6 **TASK** 60° bank, constant altitude turn, transition to cruise descent

TASK GOAL To establish descending turn from level turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH DECREASE		
3.			Relaxes elevator & stops throttle adjustment
(D)	STOPS PITCH DECREASE		F-6 (D) 27 1 V CM 3-C T-5 2 L-2 MC SJ 3 EA TR EL R-2
1.	Visual-Pitch att: descent Bank att:constant 60° Instr. cross-check Aural-Normal envir. sound Control-Decreased stick pressure Motion-Normal G, pitch stabilized		
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pressure
(E)	ESTABLISHES STEADY-STATE		F-6 (E) 0 1 V 1-C T-2 2 L-1 MC SJ 3 EA — —
1.	Visual-Pitch att: descent Bank att:constant 60° Aural-Normal envir. sound Control-Neutral stick pressure Motion-Normal G		
2.		Determines goal is established	
3.			Maintains descent control

SITUATION Aircraft climbing at constant airspeed on constant heading

TASK NO. F-7 TASK Straight ahead climb/ transition to straight and level flight

TASK GOAL To establish straight and level cruise flight DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS LEVEL OFF Visual-Pitch att: climb Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		F-7(A) 57 1 V 1-C T-2 2 L-2 RP SJ 3 ER EL TH R-2
2.		Anticipates transition to level flight	
3.			Moves elevator & throttle adjust.
(B) 1.	STARTS PITCH DECREASE Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. & throttle reduction Motion-Negative G onset, pitching down		F-7 (B) 142 1 VA CM 4-C T-8 2 L-2 MC CJ 3 ER EL TH R-2
2.		Determines satisf. pitch attitude movement	
3.			Maintains constant elevator pressure & continues throttle adjustment
(C) 1.	CONTINUES PITCH DECREASE Visual-Pitch att:decreasirg Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & throttle reduction Motion-Constant negative G, pitching down		F-7(C) 22. 1 VA CM 4-C T-8 2 L-2 MC SJ 3 EA EL TH R-2

SITUATION Aircraft climbing at constant airspeed on constant heading

TASK NO. F-7 **TASK** Straight ahead climb/ transition to straight and level flight

TASK GOAL To establish straight and level cruise flight **DATE** Oct., 1973

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)</td><td>CONTINUES PITCH DECREASE</td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines correct pitch attitude approaching</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator pressure & stops throttle adjust.</td></tr>
<tr><td>(D)
1.</td><td>STOPS PITCH DECREASE
Visual-Pitch att: cruise
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Constant stick pres.
Motion-Decreasing negative G, pitch stabilized</td><td></td><td>F-7(D) 27<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>TR
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines trim required</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Adjusts trim & relaxes elevator pressure</td></tr>
<tr><td>(E)
1.</td><td>ESTABLISHES STEADY-STATE
Visual-Pitch att: cruise
Bank att: level
Aural-Normal envir. sound
Control-Neutral stick pres.
Motion-Normal G</td><td></td><td>F-7(E) 0<table><tr><td>1</td><td>V</td><td>1-C</td><td>T-2</td></tr><tr><td>2</td><td>L-1</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>—</td><td>—</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines goal is established</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains cruise control</td></tr>
</table>

SITUATION Aircraft climbing at constant airspeed on constant heading

TASK NO. F-8 **TASK** Straight ahead climb/transition to coordinated climbing turn - 30° bank

TASK GOAL To establish climbing turn **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS TURN		F-8 (A) 60 1 V 1-C T-2 2 L-4 RP SJ 3 ER AI RU } EL R-6
1.	Visual-Pitch att: climb Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		
2.		Anticipates transition to 30° turn	
3.			Coordinates aileron & rudder, & moves elevator
(B)	STARTS ROLL		F-8(B) 150 1 V CM 3-C T-7 2 L-4 MC CJ 3 ER AI RU } EL L-5
1.	Visual-Pitch att: climb Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Positive G onset, rolling		
2.		Determines satisfactory roll rate	
3.			Maintains coordinated aileron & rudder pressure, increases elevator pressure
(C)	CONTINUES ROLL		F-8 (C) 107 1 V CM 3-C T-8 2 L-2 MC CJ 3 EA AI EL RU R-2
1.	Visual-Pitch att: climb Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, incr. elevator pres. Motion-Increasing positive G, rolling		

SITUATION Aircraft climbing at constant airspeed on constant heading

TASK NO. F-8 TASK Straight ahead climb/ transition to coordinated climbing turn - 30° bank

TASK GOAL [illegible] establish climbing turn DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES ROLL		
2.		Determines proper bank attitude approaching	
3.			Moves aileron & elevator, relaxes rudder pressure
(D)	STOPS ROLL		F8 (D) 27 1 V CM 3-C T-6 2 L-2 MC SJ 3 EA TR EL R-2
1.	Visual-Pitch att: climb Bank att:constant 30° Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron & rudder pres., constant elevator pressure Motion-Constant positive G, roll stabilized		
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pres.
(E)	ESTABLISHES STEADY-STATE		F-8 (E) 0 1 V M 2-C T-3 2 L-1 MC SJ 3 EA — —
1.	Visual-Pitch att: climb Bank att:constant 30° Aural-Normal envir. sound Control-Neutral stick pres. Motion-Constant positive G		
2.		Determines goal is established	
3.			Maintains turn control

SITUATION Aircraft in constant airspeed climb, maintaining heading

TASK NO. F-9 TASK Straight ahead climb/transition to straight ahead descent at constant airspeed

TASK GOAL To establish straight ahead descent DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS DESCENT Visual-Pitch att: climb bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G,		F-9(A) 58 1 V 1-C T-2 2 L-3 RP ST 3 ER EL TH R-3
2.		Anticipates transition to descent	
3.			Coordinates elevator & throttle adjust.
(B) 1.	STARTS PITCH DECREASE Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. & throttle reduction Motion-Negative G onset, pitching down		F-9 (B) 142 1 VA CM 4-C T-8 2 L-2 MC CJ 3 ER EL TH R-2
2.		Determines satisfactory pitch attitude movement	
3.			Maintains constant elevator pressure & continues throttle adjustment
(C) 1.	CONTINUES PITCH DECREASE Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & throttle reduction Motion-Constant negative G, pitching down		F-9 (C) 102 1 VA CM 4-C T-8 2 L-2 MC CJ 3 EA EL TH R-2

SITUATION Aircraft in constant airspeed climb, maintaining heading

TASK NO. F-9 TASK Straight ahead climb/transition to straight ahead descent at constant airspeed

TASK GOAL To establish straight ahead descent DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH DECREASE		
2.		Determines descent attitude approach.	
3.			Relaxes elevator & stops throttle adjust.
(D) 1.	STOPS PITCH DECREASE Visual-Pitch att: descent Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Decreasing stick pressure Motion-Decreasing negative G, pitch stabilized		F9 (D) 27. 1 V C M 3-C T-6 2 L-2 MC SJ 3 L-A TR EL R-2
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pressure
(E) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: descent Bank att: level Aural-Normal envir. sound Control-Neutral stick pressure Motion-Normal G,		F-9 (E) 0 1 V 1-C T-2 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established (Sustains constant speed descent)	
3.			Maintains descent control

SITUATION Aircraft descending straight ahead, cruise speed

TASK NO. F-10 TASK Straight ahead descent/ transition to straight & level flight

TASK GOAL To establish straight and level flight DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS LEVEL OFF		
1.	Visual-Pitch att: descent Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		F10 (A) 58 1 V 1-C T-2 2 L-3 RP SJ 3 ER EL TH R-3
2.		Anticipates transition to level off	
3.			Coordinates elevator & throttle adjust.
(B)	STARTS PITCH INCREASE		
1.	Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres & throttle advance Motion-Positive G onset, pitching up		F10 (B) 142 1 VA CM 4-C T-8 2 L-2 MC SJ 3 ER EL TH R-2
2.		Determines satisfactory pitch att. movement	
3.			Maintains constant elevator pressure & continues throttle adjustment
(C)	CONTINUES PITCH INCREASE		
1.	Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & throttle advance Motion-Constant positive G, pitching up		F10 (C) 22 1 VA CM 4-C T-8 2 L-2 MC SJ 3 EA EL TH R-2

SITUATION Aircraft descending straight ahead, cruise speed

TASK NO. F-10 **TASK** Straight ahead descent/ transition to straight & level flight

TASK GOAL To establish straight and level flight **DATE** Oct., 1973

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)</td><td>CONTINUOUS PITCH INCREASE</td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines cruise attitude approach.</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator pressure & stops throttle adjust.</td></tr>
<tr><td>(D)</td><td>STOPS PITCH INCREASE</td><td></td><td rowspan="2">F10 (D) 27<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>TR
EL</td><td>E-2</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: cruise
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Constant stick pres.
Motion-Decreasing positive G, pitch stabilized</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines trim required</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Adjusts trim & relaxes elevator pres.</td></tr>
<tr><td>(E)</td><td>ESTABLISHES STEADY-STATE</td><td></td><td rowspan="2">F10 (E) 0<table><tr><td>1</td><td>V</td><td>1-C</td><td>T-2</td></tr><tr><td>2</td><td>L-1</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>—</td><td>—</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: cruise
Bank att: level
Aural-Normal envir. sound
Control-Neutral stick pres.
Motion-Normal G</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines goal is established</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains cruise control</td></tr>
</table>

SITUATION Aircraft descending straight ahead, cruise airspeed

TASK NO. F-11 **TASK** Straight ahead descent/ transition to descending turn, 60° bank

TASK GOAL To establish descending turn from wings level descent **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS TURN		
1.	Visual-Pitch att: descent Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		F-11 (A) 60. 1 V 1-C T-2 2 L-4 RP SJ 3 ER AI RU ? / EL R-5
2.		Anticipates transition to 60° bank turn	
3.			Coordinates aileron & rudder, moves elevator
(B)	STARTS ROLL		
1.	Visual-Pitch att: descent Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Positive G onset, rolling		F11 (B) 147. 1 V CM 3-C T-7 2 L-2 MC CJ 3 ER AI RU EL R-2
2.		Determines satisfactory roll rate	
3.			Maintains aileron & rudder pressure, incr. elevator pres.
(C)	CONTINUES ROLL		
1.	Visual-Pitch att: descent Bank att: rolling Aural-Normal envir. sound Control-Constant aileron & rudder pressure, inc. elevator pres. Motion-Increasing positive G, rolling		F-11 (C) 107 1 V CM 3-C T-7 2 L-2 MC CJ 3 EA AI EL RU R-2

SITUATION aircraft descending straight ahead, cruise airspeed

TASK NO. F-11 TASK Straight ahead descent/ transition to descending turn, 60° bank

TASK GOAL To establish descending turn from wings level descent DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES ROLL		
2.		Determines proper bank attitude approaching	
3.			Moves aileron & elevator, relaxes rudder pressure
(D) 1.	STOPS ROLL Visual-Pitch att: descent Bank att: constant Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron & rudder pressure, constant elevator pressure Motion-Constant positive G, roll stabilized		F11 (D) 27 1 V CM 3-e T-6 2 L-2 Me SJ 3 EA TR EL R2
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pres.
(E) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: descent Bank att: constant Aural-Normal envir. sound Control-Neutral stick pres. Motion-Constant positive G		F11 (E) 0 1 V M 2-e T-3 2 L-1 Me SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains turn control

SITUATION Aircraft in constant speed descent

TASK NO. F-12 TASK Straight ahead descent/ transition to straight ahead climb

TASK GOAL To establish a wings level climb from descent DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS CLIMB		
1.	Visual-Pitch att: descent Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		F12 (A) 57 1 V 1-2 T-2 2 L-3 RP SJ 3 ER EL TH R-3
2.		Anticipates transition to constant speed climb	
3.			Coordinates elevator & throttle adjust.
(B)	STARTS PITCH INCREASE		
1.	Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. & throttle advance Motion-Positive G onset, pitching up		F12 (B) 142 1 VA CM 4-C T-8 2 L-2 MC CJ 3 EE EL TH R-2
2.		Determines satisfactory pitch attitude movement	
3.			Maintains constant elevator pressure & continues throttle adjustment
(C)	CONTINUES PITCH INCREASE		
1.	Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & throttle advance Motion-Constant positive G, pitching up		F12 (C) 102 1 VA CM 4-2 T-8 2 L-2 MC CJ 3 EA EL TH R-2

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SITUATION Aircraft in constant speed descent

TASK NO. F-12 TASK Straight ahead descent/ transition to straight ahead climb

TASK GOAL To establish a wings level climb from descent DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH INCREASE		
2.		Determines climb attitude approach.	
3.			Relaxes elevator & stops throttle adjustment
(D)	STOPS PITCH INCREASE		F12 (D) 27.
1.	Visual-Pitch att: climb Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Constant stick pressure Motion-Decreasing positive G, pitch stabilized		1 V CM 3-C T-6 2 L-2 MC SJ 3 EA EL TR R-2
2.		Determines need for trim	
3.			Adjusts trim & relaxes elevator pres.
(E)	ESTABLISHES STEADY-STATE		F12 (E) 0.
1.	Visual-Pitch att: climb Bank att: level Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal G		1 V 1-C T-2 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains climb control

SITUATION Aircraft straight and level at low cruise speed

TASK NO. F-13 **TASK** Low cruise/transition to normal cruise

TASK GOAL To establish normal cruise **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS NORMAL CRUISE Visual-Pitch att: nose high Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		F-13 (A) 57. 1 V 1-C T-2 2 L-2 RP SJ 3 ER TH EL R-2
2.		Anticipates transition to normal cruise	
3.			Adjusts throttle & decr. elevator pres.
(B) 1.	STARTS ACCELERATION Visual-Pitch att: decreasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. & throttle advance Motion-Normal G, acceleration, pitching down		F-13 (B) 141. 1 VA CM 4C T-8 2 L-2 MC CJ 3 ER EL R-1
2.		Determines satisf. power setting & pitch decrease	
3.			Decr. elevator pres.
(C) 1.	CONTINUES ACCELERATION Visual-Pitch att: decreasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Normal G, acceleration, pitching down		F-13 (C) 27 1 V CM 3C T-6 2 L-2 MC SJ 3 EA TH EL R-2
2.		Determines proper speed approaching	
3.			Adjusts throttle & maintains elevator pressure

SITUATION Aircraft straight and level at low cruise speed

TASK NO. F-13 **TASK** Low cruise/transition to normal cruise

TASK GOAL To establish normal cruise **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(D)	STOPS ACCELERATION		F13 (D) 22
1.	Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & throttle reduction Motion-Normal G, pitch stabilized		1 VA CM 4-C T-7 2 L-2 MC SJ 3 EA TR EL R-2
2.		Determines speed correct & trim required	
3.			Adjusts trim & relaxes elevator pressure
(E)	ESTABLISHES STEADY-STATE		F13 (E) 0
1.	Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal G		1 V 1-C T-2 2 L-1 MC CT 3 EA — —
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-14 **TASK** Normal cruise/transition to low cruise

TASK GOAL To establish low cruise **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS LOW CRUISE		F-14 (A) 57 1 V 1-C T-2 2 L-2 RP SJ 3 ER TH EL R-2
1.	Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		
2.		Anticipates transition to low cruise	
3.			Adjusts throttle & incr. elevator pres.
(B)	STARTS DECELERATION		F-14 (B) 141 1 VA CO 4C T-8 2 L-2 MC CJ 3 ER EL R-1
1.	Visual-Pitch att: increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. & throttle reduction Motion-Deceleration, pitching up normal G		
2.		Determines satisf. power setting & pitch increase	
3.			Incr. elevator pres.
(C)	CONTINUES DECELERATION		F-14 (C) 22 1 VA CM 4C T-7 2 L-2 MC SJ 3 EA TH EL R-2
1.	Visual-Pitch att: increasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Normal G, deceleration, pitching up		
2.		Determines proper speed approaching	
3.			Adjusts throttle & maintains elevator pressure

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. F-14 **TASK** Normal cruise/transition to low cruise

TASK GOAL To establish low cruise **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(D)
1.</td><td>STOPS DECELERATION
Visual-Pitch att: nose high
Bank att: level
Instr. cross-check
Aural-Change in envir. sound
Control-Constant stick pres.
& throttle advance
Motion-Normal G,
pitch stabilized</td><td></td><td>F-14 (D) 22.<table><tr><td>1</td><td>VA
CM</td><td>AC</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>TR
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines speed correct & trim required</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Adjusts trim & relaxes elevator pressure</td></tr>
<tr><td>(E)
1.</td><td>ESTABLISHES STEADY-STATE
Visual-Pitch att: nose high
Bank att: level
Aural-Normal envir. sound
Control-Neutral stick pres.
Motion-Normal G</td><td></td><td>F-14 (E) 0.<table><tr><td>1</td><td>V</td><td>1-C</td><td>T-2</td></tr><tr><td>2</td><td>L-1</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>—</td><td>—</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines goal is established</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains low cruise control</td></tr>
</table>

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85%

TASK NO. Cp-1 TASK Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	RELEASES BRAKES & ADVANCES POWER		
1.	Visual-Pitch att: level Bank att: level Outside reference: runway centerline & Instr. cross-check Aural-Normal envir. sound Control-Constant brake pedal pressure Motion-Normal G		Cp-1 (A) 14 1 V C 2-C T-5 2 L-3 RP SJ 3 EA OO TH OO R-4
2.		Anticipates releasing brakes, advancing power & engaging nosewheel steering	
3.			Coordinates brake release, throttle advancement & nose-gear steering engagement
(B)	BEGINS TAKEOFF ROLL		
1.	Visual-Pitch att: level Bank att: level Outside reference Aural-Change in envir. sound Control-Neutral stick pres., relaxed brake pedal pressure, throttle advancement & nose-gear steering engagement Motion-Acceleration, vibration		Cp-1 (B) 1 1 VA CM 4-C T-9 2 L-2 RP SJ 3 EA RU R-1
2.		Anticipates need for directional control to maintain desired runway heading	
3.			Maintains directional control with rudder

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85%

TASK NO. CP-1 TASK Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES TAKEOFF ROLL		CP-1 (C) 81.
1.	Visual-Pitch att: level Bank att: level Outside reference Aural-Change in envir. sound Control-Neutral stick pres., variable rudder pedal pressure, & nosegear steering engaged Motion-Acceleration, vibration		1 VA CM · A-C · T-8 2 L-2 · MC · SJ 3 EA · RV · R-1
2.		Determines aircraft is tracking centerline & need for smaller corrections as ground/airspeed increases	
3.			Maintains directional control with rudder
(D)	ROTATES AIRCRAFT		CP-1 (D) 62.
1.	Visual-Pitch att: level Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Neutral stick pres., slight rudder pres., nosegear steering engaged Motion-Acceleration, vibration		1 VA CM · AC · T-9 2 L-2 · MC · SJ 3 ER · EL RV · R-2
2.		Determines nosewheel lift off position & need to disengage nosegear steering	
3.			Moves elevator to establish takeoff att. & moves rudder

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85%

TASK NO. Cp-1 **TASK** Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	OBTAINS TAKEOFF ATTITUDE		
1.	Visual-Pitch att: increasing Bank att: level Outside reference Instr. cross-check Aural-Changing envir. sound Control-Increased stick pres. nosegear steering released Motion-Acceleration, pitching up, vibration		Cp-1 (E) 1-2 1 VA CM 4C T-10 2 L-2 MC CJ 3 ER EL TR R-2
2.		Determines required takeoff attitude position	
3.			Maintains elevator pressure & adjusts trim
(F)	AIRCRAFT BREAKS GROUND		
1.	Visual-Pitch att: climb Bank att: level Outside reference Aural-Change in envir. sound Control-Decreasing stick pres. Motion-Acceleration, pitching up		Cp-1 (F) 42 1 VA CM 4C T-7 2 L-2 RP SJ 3 ER EL A1 R-2
2.		Anticipates aircraft becoming airborne	
3.			Maintains elevator pressure & moves aileron to maintain wings level
(G)	AIRCRAFT AIRBORNE		
1.	Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85

TASK NO. Cp-1 **TASK** Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G)	AIRCRAFT AIRBORNE		Cp-1(G) 145 1 VA CM · 4-C · T-9 2 L-A · MC · CJ 3 ER · EL / AI RU } · R-5
1.	Control-Decreased stick pres. Motion-Acceleration, pitching up, lack of runway vibration		
2.		Determines aircraft safely airborne	
3.			Maintains elevator pressure, coordinates aileron & rudder to maintain wings level
(H)	RETRACKS LANDING GEAR		Cp-1 (H) 42 1 VA CM · 4C · T-8 2 L-2 · RP · SJ 3 ER · EL OO · R-2
1.	Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. Motion-Acceleration, pitching up		
2.		Anticipates increase in airspeed & need to raise landing gear	
3.			Maintains elevator pressure & activates landing gear
(I)	CONTINUES TAKEOFF		Cp-1(I) 65. 1 VA CM · 4-C · T-9 2 L-4 · MC · SJ 3 ER · AI RU } / EL · R-5
1.	Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres., gear handle movement Motion-Acceleration, pitching up		

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85%

TASK NO. Cp-1 **TASK** Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(I)</td><td>CONTINUES TAKEOFF</td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines landing gear up & locked, need to increase climb attitude</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains coordinated aileron & rudder pres, increases elevator pressure</td></tr>
<tr><td>(J)</td><td>RETRACTS FLAPS</td><td></td><td rowspan="4">CP-1 (J) 42<table><tr><td>1</td><td>VA
CM</td><td>4-C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>RP</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>A/
RU,00
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: climb
Bank att: level
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Increased stick pres.
Motion-Acceleration, pitching up</td><td></td></tr>
<tr><td>2.</td><td></td><td>Anticipates need to retract flaps & increase back pres.</td></tr>
<tr><td>3.</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>Maintains aileron & rudder pressure, activates flaps, increases elevator pres.</td></tr>
<tr><td>(K)</td><td>CONTINUES TAKEOFF</td><td></td><td rowspan="3">CP-1 (K) 62<table><tr><td>1</td><td>VA
CM</td><td>4C</td><td>T9</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL
TR</td><td>R-2</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: climb
Bank att: level
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Increased stick pres, flap switch movement
Motion-Acceleration, pitching up</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines flaps full up, need for trim, & desired pitch attitude achv'd. for climb</td></tr>
</table>

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85%

TASK NO. Cp-1 **TASK** Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(K)	CONTINUES TAKEOFF		
3.			Maintains constant elevator pressure & adjusts trim
(L)	CLIMB AIRSPEED REACHED		Cp-1 (L) 35
1.	Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral stick pres., Motion-Normal positive G, pitching up		1 V M · 2-C · T-5 2 L-4 · MC · SJ 3 EA · AL EL } TH · R-5
2.		Determines climb speed approaching & need to establish climb power	
3.			Maintains coordinated aileron, rudder & elevator control(for desired heading & climb attitude), adjusts power
(M)	ESTABLISHES STEADY-STATE CLIMB		Cp-1 (M) 25
1.	Visual-Pitch att: climb Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Neutral stick pres., reduced throttle Motion-Normal positive G, pitch stabilized		1 VA CM · 4C · T-6 2 L4 · MC · SJ 3 EA · Al RU EL } · R-5
2.		Determines desired engine parameters, & climb established	
3.			Maintains coordinated aileron & rudder, moves elevator control

SITUATION Aircraft on runway, pre-takeoff checks complete, engine(s) 85%

TASK NO. Cp-1 **TASK** Normal takeoff & climbout

TASK GOAL To perform a takeoff & climbout **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(N) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal positive G,		Cp-1(N) 0 1 V IC T-A 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains climb control

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 TASK 360° overhead landing

TASK GOAL Land aircraft DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS PITCH OUT Visual-Pitch att: cruise Bank att: level Outside ref, approaching pitch out point Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Cp-2 (A) 162 1 V 1-C T-3 2 L-4 SC SJ 3 ER AI/RU 3/EL/TH R-5
2.		Observes pitch out point	
3.			Coordinates aileron & rudder, moves elev. throttle adjustment
(B) 1.	STARTS PITCH OUT Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure; throttle reduction Motion-Positive G onset, deceleration, rolling pitching up		Cp-2 (B) 145 1 VA CM A-0 T-11 2 L-4 MC CJ 3 ER {AI/RU/EL R-6
2.		Determines satisf. roll rate & pitch attitude	
3.			Maintains coordinated aileron & rudder pres. & increases elevator pressure
(C) 1.	CONTINUES PITCH OUT Visual-Pitch att: increasing Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 **TASK** 360° overhead landing

TASK GOAL Land aircraft **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH OUT		Cp-2(C) 145 1 VA CM · 4-C · T-12 2 L-4 · MC · CJ 3 ER · AI} EL · R-5
1.	Control-Constant aileron & rudder pressure, increased elevator pressure Motion-Increasing positive G, deceleration, rolling, pitching up		
2.		Determines proper bank angle approaching	
3.			Coordinates aileron & rudder, and moves elevator
(D)	STOPS ROLL IN		Cp-2 (D) 166 1 VA CM · 4C · T-9 2 L-2 · IP · SJ 3 ER · EL · R-1
1.	Visual-Pitch att: increasing Bank att: constant Instr. cross-check Aural-Change in envir. sound Control-Neutral aileron & rudder pressure, increased elevator pressure Motion-Constant positive G, decelerating, rolling stabilized, pitching up		
2.		Sustains bank att.	
3.			Increases elevator pressure
(E)	HOLDS ESTABLISHED BANK		Cp-2(E) 145 1 VA CM · 4C · T-8 2 L-4 · MC · CJ 3 ER · {AI RU EL · R-5
1.	Visual-Pitch att: increasing Bank att: constant Outside reference Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, deceleration, pitching up		

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 TASK 360° overhead landing

TASK GOAL Land aircraft DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E) 2.		Determines roll out point	
3.			Coordinates aileron, rudder & moves elevator
(F) 1.	STARTS ROLL OUT Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure Motion-Decreasing positive G, decelerating, rolling, pitching up		Cp-2 (F) 145 1 VA CM 4C T-10 2 L-4 MC CJ 3 ER {Al Ru El} R-5
2.		Determines pitch attitude & roll rate satisfactory	
3.			Coordinates aileron & rudder, and moves elevator
(G) 1.	CONTINUES ROLL OUT Visual-Pitch att: increasing Bank att: rolling Outside reference Aural-Changing envir. sound Control-Constant aileron & rudder pres. & increasing elevator pres Motion-Decreasing positive G, Decelerating, rolling, pitching up		Cp-2 (G) 65 1 VA CM 4C T-11 2 L-4 MC SJ 3 ER {Al Ru El} R-5
2.		Determines approaching wings level	
3.			Coordinates aileron & rudder, and moves elevator

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 TASK 360° overhead landing

TASK GOAL Land aircraft DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(H)	STARTS DOWN-WIND		
1.	Visual-Pitch att: increasing Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron & rudder pres, increasing elevator pres. Motion-Normal G, decelerating, rolling stabilized, pitching up		Cp-2(H) 67 1 V CM 3-C T-8 2 L-2 MC SJ 3 ER OO EL R-2
2.		Determines need for speed brake	
3.			Activates speed brake & moves elevator
(I)	CONTINUES DOWN-WIND		
1.	Visual-Pitch att: changing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Speed brake switch movement & increased stick pressure Motion-Normal G, deceleration, buffeting, & pitching		Cp-2 (I) 62 1 VA CM 4-C T-10 2 L-2 MC SJ 3 ER OO EL R-2
2.		Determines speed to lower gear	
3.			Activates gear & moves elevator
(J)	CONTINUES DOWN-WIND		
1.	Visual-Pitch att: changing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 TASK 360° overhead landing

TASK GOAL Land aircraft DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J) 1.	CONTINUES DOWN-WIND Control-Gear handle movement & increased stick pressure Motion-Normal G, deceleration, buffeting & pitching		Cp-2(J) 142 1 VC AM 4-C T-10 2 L-2 MC CJ 3 ER EL TH R-2
2.		Determines gear down & need for increased power	
3.			Moves elevator & adjusts throttle
(K) 1.	STARTS ROLL INTO FINAL TURN Visual-Pitch att: nose high Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Throttle increase & increasing stick pressure Motion-Normal G, vibration, pitching		Cp-2(K) 145. 1 VA CM 4-C T-9 2 L-4 MC CJ 3 ER {AI RU EL | 00 R-5
2.		Determines position for beginning final turn & flap extension	
3.			Coordinates aileron & rudder, moves elev: activates flaps
(L) 1.	CONTINUES ROLL Visual-Pitch att:decreasing Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 **TASK** 360° overhead landing

TASK GOAL Land aircraft **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L)	CONTINUES ROLL		Cp-2 (L) 145 1 VA CM 4-C T-12 2 L-4 MC CJ 3 ER AI RU EL R-5
1.	Control-Flap handle movement, increased stick & rudder pressure Motion-Normal G onset, deceleration, rolling, pitching down		
2.		Determines flaps extended, pitch attitude & roll rate satisfactory	
3.			Maintains coordination of aileron & rudder & maintains elevator pressure
(M)	STOPS ROLL		Cp-2 (M) 110. 1 V CM 3-C T-8 2 L-4 MC CJ 3 EA AI RU EL R-5
1.	Visual-Pitch att: correct Bank att: rolling Outside reference, correct ground track Instr. cross-check Aural-Normal envir. sound Control-Constant stick & rudder pressure Motion-Normal G, rolling, pitch stabilized		
2.		Determines correct pitch & bank attitude approaching	
3.			Coordinates aileron & rudder, and moves elevator
(N)	CONTINUES FINAL TURN		
1.	Visual-Pitch att: descent Bank att: constant Outside reference Instr. cross-check Aural-Normal envir. sound		

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 **TASK** 360° overhead landing

TASK GOAL Land aircraft **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(N)	CONTINUES FINAL TURN		Cp 2 (N) 150
1.	Control-Neutral aileron & rudder; constant elevator pressure Motion-Normal G, rolling stabilized		1 V CM 3-C T-6 2 L-4 RP CJ 3 ER {AI RU EL} TH R-5
2.		Anticipates roll out on final & need for throttle increase	
3.			Coordinates aileron, rudder & elevator; adjusts throttle
(O)	STARTS ROLL OUT ON FINAL		Cp-2 (O) 145
1.	Visual-Pitch att: descent Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure; advances throttle Motion-Normal G, rolling		1 V A CM 4-C T-9 2 L-4 MC CJ 3 ER AI RU} EL R-5
2.		Determines pitch attitude & roll rate satisfactory	
3.			Coordinates aileron & rudder: moves elevator
(P)	CONTINUES ROLL OUT		Cp 2 (P) 30
1.	Visual-Pitch att: descent Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant stick & rudder pressure Motion-Normal G, rolling		1 V CM 3-C T-7 2 L-4 MC SJ 3 EA {AI RU EL R-5

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SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 **TASK** 360° overhead landing

TASK GOAL Land aircraft **DATE** Oct., 1973

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(P)</td><td>CONTINUES ROLL OUT</td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines wings level</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder, and moves elevator</td></tr>
<tr><td>(Q)</td><td>STOPS ROLL</td><td></td><td rowspan="2">Cp-2 (Q) 176<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>IP</td><td>CJ</td></tr><tr><td>3</td><td>EA</td><td>TH
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: descent
Bank att: level
Outside reference
Instr. cross-check
Aural-Normal envir. sound
Control-Neutral aileron & rudder; constant elevator pressure
Motion-Normal G, rolling stabilized</td><td></td></tr>
<tr><td>2.</td><td></td><td>Sustains approach attitude & determines trim required</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Adjusts trim & relaxes elevator pres.</td></tr>
<tr><td>(R)</td><td>ESTABLISH STEADY-STATE</td><td></td><td rowspan="2">Cp-2 (R) 157.<table><tr><td>1</td><td>V</td><td>1-C</td><td>T-4</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>TH
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: descent
Bank att: level
Outside reference
Instr. cross-check
Aural-Normal envir. sound
Control-Neutral stick & rudder
Motion-Normal G</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines position for round out & position to decrease rate of descent</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Adjusts throttle & moves elevator</td></tr>
</table>

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 **TASK** 360° overhead landing

TASK GOAL Land aircraft **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(S) 1.	STARTS ROUND OUT Visual-Pitch att: increasing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure & throttle reduction Motion-Normal G, pitching up, deceleration		Cp-2 (S) 142 1 VA CM 4-C T-9 2 L-2 MC CJ 3 ER EL TH R2
2.		Determines speed & rate of descent satisfactory	
3.			Moves elevator & adjusts throttle
(T) 1.	COMPLETES ROUND OUT Visual-Pitch att:increasing Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick pres. & throttle reduction Motion-Normal G, decelerating		Cp-2 (T) 82 1 VC AM 4-C T-7 2 L-2 RP CJ 3 EA EL TH R-2
2.		Anticipates touchdown	
3.			Moves elevator & adjusts throttle
(U) 1.	TOUCHDOWN Visual-Pitch att: nose high Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick pressure and throttle reduction Motion-Normal G, vibration & deceleration		Cp-2 (U) 102 1 VA CM 4-C T-9 2 L-2 MC CJ 3 EA EL oo oo oo R-2

SITUATION Aircraft at initial approach speed, level and maintaining ground track over centerline

TASK NO. Cp-2 **TASK** 360° overhead landing

TASK GOAL Land aircraft **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(U)	TOUCHDOWN		
2.		Determines proper speed to lower nosewheel & retract speedbrake; engages nosewheel steering & retracts flaps	
3.			Relaxes elevator; activates speedbrake, nosewheel steering & flaps
(V)	STARTS ROLL OUT		
1.	Visual-Runway centerline Instr. cross-check Aural-Change in envir. sound Control-Decreased stick pressure; flaps, nosewheel steering & speedbrake movement Motion-Normal G, vibration & deceleration		Cp-2 (V) 22 1 VC AM | 4-C | T-9 2 L-2 | MC | SJ 3 EA | OO RU | R-2
2.		Determines need for brakes & directional control	
3.			Activates brakes & maintains directional control with rud.
(W)	COMPLETES ROLL OUT		
1.	Visual-Runway centerline Aural-Change in envir. sound Control-Increased brake pressure Motion-Deceleration, normal G, vibration		Cp-2 (W) 0 1 VA CM | 4-C | T-5 2 L-2 | MC | SJ 3 EA | — | —
2.		Determines aircraft decelerating & goal accomplished	
3.			Maintains roll out control

SITUATION Aircraft performing shallow dive along section lines at correct power & airspeed for entry

TASK NO. Cp-3 **TASK** Chandelle

TASK GOAL To perform a Chandelle **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS CHANDELLE		CP-3 (A) 60 1 | V | 1-C | T-3 2 | L-4 | RP | SJ 3 | ER | AI RU EL | R-5
1.	Visual-Pitch att: nose low Bank att: level Outside reference Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		
2.		Anticipates climbing turn	
3.			Coordinates aileron & rudder, moves elevator
(B)	STARTS CLIMBING TURN		CP-3 (B) 147 1 | V C M | 3-C | T-9 2 | L-2 | MC | GJ 3 | ER | AI RU EL | R-2
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Positive G onset, deceleration, rolling, pitching up		
2.		Determines satisf. pitch & roll rate	
3.			Maintains constant aileron & rudder pressure, increases elevator pressure
(C)	CONTINUES CLIMBING TURN		
1.	Visual-Pitch att: increasing Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, increased elevator pressure		

SITUATION aircraft performing shallow dive along section lines at correct power & airspeed for entry

TASK NO. Cp-3 **TASK** Chandelle

TASK GOAL To perform a Chandelle **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES CLIMBING TURN		Cp-3 (C) 150 1 V CM 3-C T-11 2 L-4 MC CJ 3 ER AI/RU EL R-5
1.	Motion-Increasing positive G, deceleration, rolling, pitching up		
2.		Determines correct bank angle approaching	
3.			Coordinates aileron & rudder, increases elevator pressure
(D)	CONTINUES CLIMBING TURN		Cp3 (D) 146 1 V CM 3-C T-7 2 L-2 MC CJ 3 ER EL R-1
1.	Visual-Pitch att: increasing Bank att: constant Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron & rudder pressure, increased elevator pressure Motion-Constant positive G, deceleration, pitching up, rolling stabilized		
2.		Determines pitch rate satisfactory	
3.			Increases elevator pressure
(E)	CONTINUES CLIMBING TURN		Cp-3 (E) 164 1 V CM 3-C T-8 2 L-4 SC SJ 3 ER AI/RU EL R-5
1.	Visual-Pitch att: increasing Bank att: constant Outside reference Instr. cross-check Aural-Normal envir. sound Control-Increased elevator pressure Motion-Constant positive G, deceleration, pitching up		

SITUATION Aircraft performing shallow dive along section lines at correct power & airspeed for entry

TASK NO. Cp-3 **TASK** Chandelle

TASK GOAL To perform a Chandelle **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	CONTINUES CLIMBING TURN		
2.		Observes reference to begin roll out approaching	
3.			Coordinates aileron & rudder, increases elevator pressure
(F)	CONTINUES CLIMBING TURN		Cp-3 (F) 147 1 ✓ CM 3-C T-9 2 L-2 MC CJ 3 ER AI RU EL R-2
1.	Visual-Pitch att: increasing Bank att: decreasing Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Decreasing positive G, deceleration, rolling, pitching up		
2.		Determines satisf. roll rate	
3.			Maintains constant aileron & rudder pressure, increases elevator pressure
(G)	CONTINUES CLIMBING TURN		Cp-3 (G) 164 1 ✓ CM 3-C T-11 2 L-4 SC SJ 3 EA AI RU } EL R-5
1.	Visual-Pitch att: increasing Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, increased elevator pressure Motion-Decreasing positive G, deceleration, rolling, pitching up		
2.		Observes reference point approaching	

SITUATION Aircraft performing shallow dive along section lines at correct power & airspeed for entry

TASK NO. Cp-3 **TASK** Chandelle

TASK GOAL To perform a Chandelle **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(G)</td><td>CONTINUES CLIMBING TURN</td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder, maintains elevator pressure</td></tr>
<tr><td>(H)</td><td>STOPS CLIMBING TURN</td><td></td><td rowspan="2">Cp-3 (H) 146<table><tr><td>1</td><td>✓ CM</td><td>3-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: nose high
Bank att: level
Outside reference
Instr. cross-check
Aural-Normal envir. sound
Control-Neutral aileron & rudder pressure, constant elevator pressure
Motion-Normal G, pitch & roll stabilized</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines lower pitch attitude required</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator pressure</td></tr>
<tr><td>(I)</td><td>STARTS LEVEL OFF</td><td></td><td rowspan="2">Cp-3(I) 146<table><tr><td>1</td><td>✓ CM</td><td>3-C</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: decreasing
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Decreased stick pres.
Motion-Normal G, acceleration, pitching down</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines satisf. pitch attitude movement</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator pressure</td></tr>
</table>

SITUATION Aircraft performing shallow dive along section lines at correct power & airspeed for entry

TASK NO. Cp-3 TASK Chandelle

TASK GOAL To perform a Chandelle DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J)	CONTINUES LEVEL OFF		Cp-3 (J) 26 1 ✓CM 3-C T-6 2 L-2 MC SJ 3 EA EL R-1
1.	Visual-Pitch att: decreasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Decreased stick pres. Motion-Normal G, acceleration, pitching down		
2.		Determines cruise attitude approaching	
3.			Relaxes elevator pressure
(K)	STOPS LEVEL OFF & ESTABLISHES STEADY-STATE		Cp-3 (K) 0 1 ✓M 2-C T-4 2 L-1 MC SJ 3 EA — —
1.	Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G, pitching stabilized		
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-4 **TASK** Lazy-8

TASK GOAL To perform a Lazy-8 **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS LAZY-8		Cp-4 (A) 60 1 V 1-C T-3 2 L-4 RP SJ 3 ER AI RU 3 EL R-5
1.	Visual-Pitch att: cruise Bank att: level Outside reference Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		
2.		Anticipates performance of Lazy-8	
3.			Coordinates aileron & rudder, moves elevator
(B)	STARTS CLIMBING TURN		CP-4 (B) 147 1 V CM 3-C T-9 2 L-2 MC CJ 3 ER AI RU EL R-2
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, increased elevator pres. Motion-Positive G onset, deceleration, rolling, pitching up		
2.		Determines satisf. pitch & roll rate	
3.			Maintains constant aileron & rudder pressure, moves elevator
(C)	CONTINUES CLIMBING TURN		
1.	Visual-Pitch att: increasing Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, increased elevator pressure		

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-4 TASK Lazy-8

TASK GOAL To perform a Lazy-8 DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUOUS CLIMBING TURN		Cp4 (C) 163 1 V CM 3-C T-11 2 L-2 SC SJ 3 ER AI RU EL R-2
1.	Motion-Constant positive G, deceleration, rolling, pitching up		
2.		Observes reference for maximum bank approaching	
3.			Maintains constant aileron, rudder & elevator pressure
(D)	CLIMBING TURN AT HIGH POINT		Cp-4 (D) 163 1 V CM 3-C T-11 2 L-2 SC SJ 3 ER AI RU EL R-2
1.	Visual-Pitch att: constant Bank att: rolling Outside reference Aural-Normal envir. sound Control-Constant aileron, rudder & elevator pressure Motion-Constant positive G, deceleration, pitch constant, rolling		
2.		Observes reference for maximum bank	
3.			Maintains constant aileron & rudder pressure, relaxes elevator pressure
(E)	BEGINS DESCENDING TURN		
1.	Visual-Pitch att: decreasing Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, decreased elevator pressure		

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-4 **TASK** Lazy-8

TASK GOAL To perform a lazy-8 **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	CONTINUES DESCENDING TURN		Cp-4 (E) 150 1 V CM 3-C T-11 2 L-4 MC SJ 3 ER AI RU EL R-5
1.	Motion-Negative G onset, acceleration, rolling, pitching down		
2.		Determines satisf. pitch and roll rate	
3.			Coordinates aileron & rudder, relaxes elevator pressure
(F)	CONTINUES DESCENDING TURN		Cp-4 (F) 147 1 V CM 3-C T-10 2 L-2 MC CJ 3 ER AI RU EL R-2
1.	Visual-Pitch att: decreasing Bank att: rolling Instr. cross-check Aural-Normal envir. sound Control-Increased aileron & rudder pressure, decreased elevator pressure Motion-Constant negative G, acceleration, rolling, pitching down		
2.		Determines satisf. pitch & roll rate	
3.			Maintains constant aileron & rudder pressure, relaxes elevator pressure
(G)	CONTINUES DESCENDING TURN		
1.	Visual-Pitch att: decreasing Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant aileron & rudder pressure, relaxes elevator pressure		

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-4 **TASK** Lazy-8

TASK GOAL To perform a Lazy-8 **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G)	CONTINUES DESCENDING TURN		Cp-4 (G) 163 1 V CM 3-C T-11 2 L-2 SC SJ 3 EA Al EL RU R-2
1.	Motion-Decreasing negative G, acceleration, rolling, pitching down		
2.		Observes 180° reference approaching	
3.			Moves aileron, relaxes elevator & rudder pressure
(H)	STOPS DESCENDING TURN		Cp-4 (H) 55. 1 V M 2-C T-6 2 L-4 RP SJ 3 ER Al RU EL R-5
1.	Visual-Pitch att: cruise Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G, pitch & roll stabilized		
2.		Anticipates reversal of maneuver	
3.			All Cues, Mental Action & Motor Action identical for second half of Lazy-8 starting with the Motor Action in Sequence A

SITUATION Aircraft in landing configuration at idle power, descending straight ahead at approach speed

TASK NO. Cp-5 **TASK** Straight ahead landing attitude stall

TASK GOAL Initiate and recover from approach to landing stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS APPROACH TO LANDING STALL		
1.	Visual-Pitch att: nose low Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Cp-5 (A) 56. 1 V 1-C T-2 2 L-1 RP SJ 3 ER EL R-1
2.		Anticipates stall entry	
3.			Moves elevator
(B)	STARTS PITCH INCREASE		
1.	Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Positive G onset, deceleration, pitching up		Cp-5 (B) 146 1 V CM 3-C T-7 2 L-2 MC CJ 3 ER EL R-1
2.		Determines satisf. pitch attitude movement	
3.			Moves elevator
(C)	CONTINUES PITCH INCREASE		
1.	Visual-Pitch att: increasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Constant positive G, deceleration, pitching up		Cp-5 (C) 106 1 V CM 3C T-7 2 L-2 MC CJ 3 EA EL R-1
2.		Determines correct pitch attitude approaching	
3.			Moves elevator

SITUATION Aircraft in landing configuration at idle power, descending straight ahead at approach speed

TASK NO. Cp-5 TASK Straight ahead landing attitude stall

TASK GOAL Initiate and recover from approach to landing stall DATE Feb. 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(D)	STOPS PITCH INCREASE & CONTINUES DECELERATION		Cp-5 (D) 6 1 V CM · 3C · T-7 2 L-2 · RP · SJ 3 EA · EL · R-1
1.	Visual-Pitch att: nose high Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Decreasing positive G, deceleration, pitch stabilized		
2.		Anticipates stall	
3.			Moves elevator
(E)	IDENTIFIES STALL		Cp-5 (E) 62 1 VA CM · 4C · T-6 2 L-2 · MC · SJ 3 ER · EL TH · R-2
1.	Visual-Pitch att: nose high Bank att: level Aural-Change in envir. sound Control-Increased stick pres. Motion-Normal G, deceleration, buffeting		
2.		Determines aircraft stalled	
3.			Moves elevator & adjusts throttle
(F)	STARTS STALL RECOVERY		Cp-5 (F) 142 1 VA CM · 4C · T-7 2 L-2 · MC · CJ 3 ER · EL OO · R-2
1.	Visual-Pitch att: decreasing Bank att: level Aural-Change in envir. sound Control-Increased stick pres. Motion-Negative G onset, acceleration, pitching down		
2.		Determines satisf. pitch attitude movement & power increase	
3.			Maintains elevator pressure & activates speed brake (retracts

SITUATION Aircraft in landing configuration at idle power, descending straight ahead at approach speed

TASK NO. Cp-5 **TASK** Straight ahead landing attitude stall

TASK GOAL Initiate and recover from approach to landing stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G) 1.	CONTINUES STALL RECOVERY Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & speed brake lever movement Motion-Constant negative G, acceleration, pitching down		Cp-5 (G) 101. 1 VA CM · 4-C · T-9 2 L-2 · MC · CJ 3 EA · EL · R-1
2.		Determines correct pitch approaching	
3.			Relaxes elevator pressure
(H) 1.	STARTS CLIMB Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Decreased stick pres. Motion-Normal G, acceleration, pitch stabilized		Cp5 (H) 61 1 VA CM · AC · T-7 2 L-2 · MC · SJ 3 ER · EL · R-1
2.		Determines sufficient speed for increased pitch att.	
3.			Moves elevator
(I) 1.	CONTINUES CLIMB Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Positive G onset, pitching up		Cp5 (I) 147 1 V C-1 · 3-C · T-6 2 L-2 · MC · CJ 3 ER · EL OO · R-2
2.		Determines satisf. pitch attitude movement & positive climb	

SITUATION Aircraft in landing configuration at idle power, descending straight ahead at approach speed

TASK NO. Cp-5 **TASK** Straight ahead landing attitude stall

TASK GOAL Initiate and recover from approach to landing stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(I) 3.	CONTINUES CLIMB		Maintains elevator pressure & activates gear lever
(J) 1.	CONTINUES CLIMB Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres., gear lever movement Motion-Constant positive G, pitching up		Cp-5 (J) 101 1 VA CM, 4-C, T-8 2 L-2, MC, CJ 3 EA, EL, R-1
2.		Determines correct pitch attitude approaching	
3.			Relaxes elevator pressure
(K) 1.	CONTINUES CLIMB Visual-Pitch att: nose high Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Decreased stick pres. Motion-Decreasing positive G, pitch stabilized		Cp-5 (K) 67 1 V CM, 3-C, T-6 2 L-2, MC, CJ 3 ER, EL OO, R-2
2.		Determines correct speed for flap retraction	
3.			Activates flap lever & moves elevator
(L) 1.	CONTINUES CLIMB Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres., flap lever movement Motion-Normal G,pitching up		Cp-5 (L) 22 1 VA CM, 4-C, T-6 2 L-2, MC, SJ 3 EA, EL TR, R-2

SITUATION Aircraft in landing configuration at idle power, descending straight ahead at approach speed

TASK NO. Cp-5 TASK Straight ahead landing attitude stall

TASK GOAL Initiate and recover from approach to landing stall DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L)	CONTINUES CLIMB		
2.		Determines trim required	
3.			Adjusts trim & relaxes elevator pressure
(L) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: climb Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		CP5 (M) 0. 1 V I-C TB 2 L-I MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains climb control

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Cp-6 **TASK** Straight ahead power on stall and recovery

TASK GOAL Initiate and recover from take-off and departure stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS POWER ON STALL Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Cp-6 (A) 57. 1 V 1-C T-2 2 L-2 PP SJ 3 ER TH EL R-2
2.		Anticipates stall entry	
3.			Adjusts throttle & moves elevator
(B) 1.	STARTS PITCH INCREASE & DECELERATION Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure & throttle reduction Motion-Positive G onset, deceleration, pitching up		Cp6 (B) 141 1 VA CM 4-C T-9 2 L-2 MC CJ 3 ER EL R-1
2.		Determines satisf. pitch attitude movement	
3.			Maintains constant elevator pressure
(C) 1.	CONTINUES PITCH INCREASE & DECELERATION Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Constant stick pressure Motion-Constant positive G, deceleration, pitching up		Cp6 (C) 106. 1 V CM 3-C T-7 2 L-2 MC CJ 3 EA EL R-1
2.		Determines correct pitch attitude approaching	

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Cp-6 **TASK** Straight ahead power on stall and recovery

TASK GOAL Initiate and recover from take-off and departure stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES PITCH INCREASE & DECELERATION		
3.			Relaxes elevator pressure
(D)	STOPS PITCH INCREASE & CONTINUES DECELERATION		Cp-6 (D) 106 1 V CM 3C T-7 2 L-2 MC CJ 3 EA EL R-1
1.	**Visual**-Pitch att: nose high Bank att: level Instr. cross-check **Aural**-Normal envir. sound **Control**-Decreased stick pressure **Motion**-Decreasing positive G, deceleration, pitch stabilized		
2.		Determines correct pitch attitude & satisf. deceleration	
3.			Moves elevator
(E)	CONTINUES DECELERATION		Cp-6 (E) 41 1 VC AM 4C T-7 2 L-2 RP SJ 3 ER EL R-1
1.	**Visual**-Pitch att: nose high Bank att: level Instr. cross-check **Aural**-Change in envir. sound **Control**-Increased stick pressure **Motion**-Normal G, deceleration, buffeting		
2.		Anticipates stall	
3.			Moves elevator
(F)	IDENTIFIES STALL		Cp-6 (F) 62 1 VA CM 4C T-8 2 L-2 MC SJ 3 ER EL TH R-2
1.	**Visual**-Pitch att:decreasing Bank att: level **Aural**-Change in envir. sound **Control**-Increased stick pres. **Motion**-Negative G onset, deceleration, buffeting, pitching down		

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Cp-6 **TASK** Straight ahead power on stall and recovery

TASK GOAL Initiate and recover from take-off and departure stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(F)	IDENTIFIES STALL		
2.		Determines aircraft stalled	
3.			Moves elevator & adjusts throttle
(G)	STARTS STALL RECOVERY		Cp-6 (G) 144 1 VA CM | 4C | T-10 2 L-2 | MC | CJ 3 ER | EL | R-1
1.	Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure & throttle advance Motion-Increasing negative G, acceleration, decreased buffeting, pitching down		
2.		Determines satisf. pitch attitude movement & power increase	
3.			Maintains elevator pressure
(H)	CONTINUES STALL RECOVERY		Cp-6 (H) 106. 1 V CM | 3-2 | T-7 2 L-2 | MC | CJ 3 EA | EL | R-1
1.	Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Constant stick pressure Motion-Constant negative G, acceleration, pitching down		
2.		Determines recovery attitude	
3.			Relaxes elevator pressure

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Cp-6 **TASK** Straight ahead power on stall and recovery

TASK GOAL Initiate and recover from take-off and departure stall **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(I)
1.</td><td>CONTINUES STALL RECOVERY
Visual-Pitch att: nose low
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Constant stick pressure
Motion-Decreasing negative G, acceleration, pitch stabilized</td><td></td><td>Cp-6 (I) 146<table><tr><td>1</td><td>V
CM</td><td>3C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines increased pitch attitude required</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Moves elevator</td></tr>
<tr><td>(J)
1.</td><td>STOPS DESCENT
Visual-Pitch att:increasing
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Increased stick pressure
Motion-Positive G onset, acceleration, pitching up</td><td></td><td>Cp-6 (J) 26<table><tr><td>1</td><td>V
CM</td><td>3C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines maintaining altitude</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator pressure</td></tr>
<tr><td>(K)
1.</td><td>STARTS TRANSITION TO NORMAL CRUISE
Visual-Pitch att: nose high
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Constant stick pressure
Motion-Decreasing positive G, acceleration, pitch stabilized</td><td></td><td>Cp6(K) 66<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
</table>

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Cp-6 **TASK** Straight ahead power on stall and recovery

TASK GOAL Initiate and recover from take-off and departure stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(K)	STARTS TRANSITION TO NORMAL CRUISE		
2.		Determines need for cruise attitude	
3.			Moves elevator
(L)	CONTINUES TRANSITION TO NORMAL CRUISE		Cp-6 (L) 107 1 V CM 3C T-7 2 L-2 MC CJ 3 EA EL TH R-2
1.	Visual-Pitch att:decreasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pressure Motion-Negative G onset, acceleration, pitching down		
2.		Determines cruise attitude & speed approaching	
3.			Relaxes elevator & adjusts throttle
(M)	ESTABLISHES NORMAL CRUISE		Cp-6 (M) 0 1 VA CM 4C T-8 2 L-1 MC SJ 3 EA — —
1.	Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Decreased stick pressure & throttle reduction Motion-Decreasing negative G, pitch stabilized		
2.		Determines straight & level normal cruise, goal is established	
3.			Maintains cruise control

SITUATION Aircraft straight & level at pattern entry speed & power

TASK NO. Cp-7 **TASK** Accelerated (high speed) stall

TASK GOAL To initiate & recover from high speed stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS STALL		
1.	Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Cp-7 (A) 60 1 V 1-C T-2 2 L-4 RP SJ 3 ER AI RU} EL.TH R-5
2.		Anticipates stall entry	
3.			Coordinates aileron & rudder, moves elevator, adjusts throttle
(B)	STARTS ROLL		
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure, decreased throttle Motion-Positive G onset, deceleration, rolling, pitching up		Cp-7 (B) 145 1 VA CM 4-C T-11 2 L-4 MC CJ 3 ER AI RU} EL R-5
2.		Determines satisf. roll rate & pitch attitude movement	
3.			Maintains coordinated aileron & rudder, increases elevator pressure
(C)	CONTINUES ROLL		
1.	Visual-Pitch att: increasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Constant aileron & rudder pressure, increased elevator pressure		

SITUATION Aircraft straight & level at pattern entry speed & power

TASK NO. Cp-7 **TASK** Accelerated (high speed) stall

TASK GOAL To initiate & recover from high speed stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES ROLL		Cp-7 (C) 145 1 VA OM / 4C / F11 2 L-4 / MC / CJ 3 ER / AI RU } EL / R-5
1.	Motion-Increasing positive G, deceleration, rolling, pitching up		
2.		Determines proper bank attitude approaching	
3.			Coordinates aileron & rudder, increases elevator pressure
(D)	CONTINUES STALL ENTRY		Cp-7 (D) 126 1 V CM / 3-C / T-9 2 L-2 / RP / CJ 3 ER / EL / R-1
1.	Visual-Pitch att: increasing Bank att: constant Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron* & rudder pressure, increased elevator pressure Motion-Increasing positive G, deceleration, rolling stabilized, pitching up, buffet onset		
2.		Anticipates critical angle of attack	
3.			Increases elevator pressure
(E)	IDENTIFIES STALL		
1.	Visual-Pitch att: nose high Bank att: constant Aural-Change in envir. sound Control-Increased elevator pressure		

* Some aircraft will require opposite aileron pressure to maintain a constant bank angle as speed decreases.

SITUATION Aircraft straight & level at pattern entry speed & power

TASK NO. Cp-7 **TASK** Accelerated (high speed) stall

TASK GOAL To initiate & recover from high speed stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E) 1.	IDENTIFIES STALL Motion-Constant positive G, deceleration, pitching down, buffeting		Cp-7 (E) 65 1 VA CM · 4-C · T-8 2 L-4 · MC · SJ 3 ER · AI RU} EL, TH · R-5
2.		Determines aircraft stalled	
3.			Coordinates aileron & rudder, moves elevator, adjusts throttle
(F) 1.	STARTS RECOVERY Visual-Pitch att: decreasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure, increased throttle Motion-Decreasing positive G, acceleration, pitching down, rolling		Cp-7 (F) 142 1 VA CM · 4-C · T-11 2 L-2 · MC · CJ 3 ER · AI RU EL · R-2
2.		Determines pitch change & roll rate satisfactory	
3.			Maintains constant aileron, rudder & elevator pressure
(G) 1.	CONTINUES RECOVERY Visual-Pitch att: decreasing Bank att: rolling Instr. cross-check Aural-Change in envir. sound Control-Constant stick & rudder pressure Motion-Decreasing positive G, acceleration, rolling, pitching down		CP7 (G) 102. 1 VA CM · 4-C · T-10 2 L-2 · MC · CJ 3 EA · AI EL RU · R-2

SITUATION Aircraft straight & level at pattern entry speed & power

TASK NO. Cp-7 **TASK** Accelerated (high speed) stall

TASK GOAL To initiate & recover from high speed stall **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G)	CONTINUES RECOVERY		
2.		Determines correct pitch & bank attitude approaching	
3.			Moves aileron & elevator, relaxes rudder pressure
(H)	ESTABLISHES STEADY-STATE		
1.	Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G, pitch & roll stabilized		Cp-7 (H) o. 1 V 1-C I-S 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-8 TASK Spin recovery

TASK GOAL To regain straight & level flight from spin condition DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS ENTRY MANEUVER Visual-Pitch att: cruise Bank att: level Outside reference Instrument cross-check Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal G		Cp8 (A) 56 1 V 1-C T-4 2 L-1 RP SJ 3 ER EL R-1
2.		Anticipates pullup for spin entry & need to retract power to idle at first stall indic.	
3.			Moves elevator
(B) 1.	ESTABLISHES NOSE-HIGH PITCH ATTITUDE Visual-Pitch att: increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. Motion-Positive G onset, pitching up		Cp8 (B) 145 1 VA CM AC T-8 2 L-4 MC CJ 3 ER AI RUS / EL R-5
2.		Determines establishing a shallow bank in the direction of spin before stall occurs	
3.			Coordinates aileron & rudder, maintains elevator pressure
(C) 1.	APPROACHES STALL CONDITION Visual-Pitch att: climb Bank att: rolling Outside reference Aural-Change in envir. sound Control-Increased stick & rudder pressure Motion-Increasing positive G, pitching up, rolling & stall onset		Cp8 (C) 125 1 VA CM AC T-10 2 L-4 RP CJ 3 ER EL RUS / TM R-5

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-8 **TASK** Spin recovery

TASK GOAL To regain straight & level flight from spin condition **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C) 2.	APPROACHES STALL CONDITION	Anticipates stall indication & need to increase stick back pressure with full rudder in direction of spin, & reducing power to idle	
3.			Coordinates elevator & rudder, adjusts throttle
(D) 1.	STALL REACHED Visual-Pitch att: climb Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure, throttle reduced Motion-Decreasing positive G, buffeting, rolling, pitching up		Cp-8 (D) 42 1 VA CM 4-C T-12 2 L-2 RD SJ 3 ER EL RU R-2
2.		Anticipates holding full aft stick, & rudder against stop	
3.			Maintains full elevator, & rudder against stop
(E) 1.	AIRCRAFT ENTERS SPIN Visual-Pitch att: pitching Bank att: rolling Outside reference Aural-Change in envir. sound Control-Constant stick & rudder pressure Motion-Normal positive G, increased buffeting, pitching up, rolling		Cp-8 (E) 62. 1 VA CM 4-C T-9 2 L-2 MC SJ 3 ER RU EL R-2

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-8 **TASK** Spin recovery

TASK GOAL To regain straight & level flight from spin condition **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	AIRCRAFT ENTERS SPIN		
2.		(Anticipates aircraft nose oscillating & then damping out) Determines spin direction & need to effect recovery procedure prior to spin stabilizing	
3.			Moves rudder to neutral, & maintains full elevator
(F) 1.	RECOVERY PROCEDURE INITIATED Visual-Pitch att: dive Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Decreased rudder pedal pressure, constant stick pressure Motion-Spinning, increasing lateral G, pitching down		Cp-8 (F) 62 1 VA CM 4-C T-10 2 L-2 MC SJ 3 ER RU EL R-2
2.		Determines direction of spin rotation, need to apply full opposite rudder to the direction of spin & moving stick forward to neutral position	
3.			Moves rudder & elevator
(G) 1.	SPIN ROTATION STOPPED Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound		

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-8 **TASK** Spin recovery

TASK GOAL To regain straight & level flight from spin condition **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G) 1.	SPIN ROTATION STOPPED Control-Increased rudder pedal & stick pres. Motion-Increasing lateral G, spinning, pitching down		Cp-8 (G) 41. 1 VA CM · 4-C · T-9 2 L-2 · RP · SJ 3 ER · RU · R-1
2.		Anticipates rotation to stop & need to neutralize rudder	
3.			Moves rudder
(H) 1.	RECOVERS FROM ENSUING DIVE Visual-Pitch att: dive Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Decreased rudder pedal pressure Motion-Decreasing lateral G, pitching down		Cp-8 (H) 62. 1 VA CM · 4C · T-8 2 L-2 · MC · SJ 3 ER · EL OO · R-2
2.		Determines need to increase back pres. before rapid airspeed increase, & to deploy speed brake	
3.			Moves elevator & activates speed brake
(I) 1.	CONTINUES RECOVERY Visual-Pitch att:increasing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres, speed brake switch movement Motion-Increasing positive G, pitching up		Cp-8 (I) 2 1 VA CM · 4C · T-9 2 L-2 · RP · SJ 3 EA · EL TH TR · R-2

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Cp-8 **TASK** Spin recovery

TASK GOAL To regain straight & level flight from spin condition **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(I)	CONTINUES RECOVERY		
2.		Anticipates reaching level flight & need to add power	
3.			Relaxes elevator, adjusts throttle & trim
(J)	RECOVERY COMPLETE		Cp8(J) 0 1 V 1-C T-4 2 L-1 MC SJ 3 EA — —
1.	Visual-Pitch att: cruise Bank att: level Outside reference Aural-Normal envir. sound Control-Neutral stick pres., throttle advance Motion-Normal G		
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Two-aircraft element, level flight, cruise power, fingertip formation

TASK NO. Cp-9 **TASK** Hold wingman's position

TASK GOAL To maintain fingertip position **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	MAINTAINS FINGERTIP FORMATION		Cp-9 (A) .12 1 V C 2-C T-4 2 L-2 RP SJ 3 EA RU, AI EL, TH R-2
1.	Visual-Pitch att: cruise Bank att: level Outside ref: lead aircraft longitudinal & vertical position references constant Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal G		
2.		Anticipates change in position reference & need to maintain desired formation position	
3.			* Maintains aileron, rudder & elevator control pressure; adjusts throttle
(B)	CHANGE IN LONGITUDINAL POSITION OCCURS		Cp-9 (B) .32 1 V C 2-C T-5 2 L-2 MC SJ 3 EA TH, AI RU, EL R-2
1.	Visual-Pitch att: cruise Bank att: level Outside ref: change in lead aircraft longitudinal position reference Aural-Normal envir. sound Control-Increased stick pres. & reduced throttle Motion-Normal G		
2.		Determines longitudinal reference chge. & need to adjust throttle to regain position	
3.			Adjusts throttle; maintains aileron, rudder & elevator control pressures
*	Formation flying requires constant control pressures		

SITUATION Two-aircraft element, level flight, cruise power, fingertip formation

TASK NO. Cp-9 TASK Hold wingman's position

TASK GOAL To maintain fingertip position DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	POSITION REGAINED		
1.	Visual-Pitch att: cruise Bank att: level Outside ref: longitudinal & vertical references return to desired position Aural-Normal envir. sound Control-Constant stick pres. & throttle advancement Motion-Normal G		Cp-9 (C) 32 1 ✓ C 2C T-5 2 L-2 MC SJ 3 EA TH, AI RU, EL R-2
2.		Determines throttle adjustment satisfactory to regain position & need to readjust throttle to maintain position	
3.			Adjusts throttle; maintains aileron, rudder & elevator control pressure
(D)	CHANGE IN VERTICAL POSITION OCCURS		
1.	Visual-Pitch att: cruise Bank att: level Outside ref: change in vertical ref. Aural-Normal envir. sound Control-Constant stick pres., reduced throttle Motion-Normal G		Cp-9 (D) 32 1 ✓ C 2C T-5 2 L-2 MC SJ 3 EA EL, TH AI, RU R-2
2.		Determines vertical reference change & need to adjust position with throttle	
3.			Increases elevator pressure, adjusts throttle, maintains aileron & rudder control pressure

SITUATION Two-aircraft element, level flight, cruise power, fingertip formation

TASK NO. Cp-9 **TASK** Hold wingman's position

TASK GOAL To maintain fingertip position **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(E)
1.</td><td>POSITION REGAINED
Visual-Pitch att: cruise
Bank att: level
Outside ref:vertical reference returns to desired position
Aural-Normal envir. sound
Control-Increased stick pres. & advanced throttle
Motion-Normal G</td><td></td><td>Cp-9 (E) 32<table><tr><td>1</td><td>✓ C</td><td>2-C</td><td>T-5</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>EL, AI
RU, TH</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines vertical reference change satisfactory & need to maintain position</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator, maintains aileron & rudder control pressure, adjusts throttle</td></tr>
<tr><td>(F)
1.</td><td>FINGERTIP FORMATION MAINTAINED
Visual-Pitch att: cruise
Bank att: level
Outside ref:longitudinal & vertical references constant
Aural-Normal envir. sound
Control-Constant stick pres.
Motion-Normal G</td><td></td><td>Cp-9 (F) 32.<table><tr><td>1</td><td>✓ C</td><td>2-C</td><td>T-4</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>AI, RU
TH, EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines goal is established</td><td></td></tr>
<tr><td>3.</td><td>NOTE: NO STEADY-STATE CAN BE ACHIEVED DURING CLOSE FORMATION</td><td></td><td>Maintains aileron, rudder & elevator control pressure; throttle adjustment</td></tr>
</table>

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-10 TASK Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns away from wingman DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	MAINTAINS FINGERTIP FORMATION		Cp-10 (A) 12.
1.	Visual-Pitch att: cruise Bank att: level Outside ref: lead aircraft longitudinal & vertical position references constant Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal G		1 $\overset{V}{C}$ 2C T4 2 L-2 RP SJ 3 EA AI,RU EL,TH R-2
2.		Anticipates turn will be made away from or into lead, & need to increase or decrease power & back pressure accordingly	
3.			* Maintains aileron, rudder & elevator control pressure; adjusts throttle
(B)	LEAD AIRCRAFT BEGINS TURN AWAY FROM WINGMAN		Cp-10 (B) 75.
1.	Visual-Pitch att: cruise Bank att: level Outside ref: lead aircraft longitudinal & vertical references change Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal G		1 $\overset{V}{C}$ 2-C T-4 2 L-4 MC SJ 3 ER EL TH AI,RU R-5
2.		Determines turn away from wingman & need to increase power to climb & maintain relative position	
3.			Coordinates elevator & throttle adjustment, maintains aileron & rudder control pres.

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-10 **TASK** Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns away from wingman **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)</td><td>MAINTAINS CONSTANT RATE TURN</td><td></td><td>Cp-10(C) - 110.</td></tr>
<tr><td>1.</td><td>Visual-Pitch att: changing
Bank att: rolling
Outside ref: longitudinal & vertical references constant
Aural-Normal envir. sound
Control-Increased stick pres. & throttle advancement
Motion-Positive G onset, pitching up, rolling</td><td></td><td><table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-8</td></tr><tr><td>2</td><td>L-4</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>EA</td><td>EL
TH
AI, RU</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines need to reduce power & relax back pressure sufficiently to maintain position during turn</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates elevator & throttle adjustment, maintains aileron & rudder control pres.</td></tr>
<tr><td>(D)</td><td colspan="3">STARTS ROLL OUT OF TURN, BACK TO STRAIGHT & LEVEL FLIGHT</td></tr>
<tr><td>1.</td><td>Visual-Pitch att: constant
Bank att: constant
Outside ref: longitudinal & vertical references change
Aural-Normal envir. sound
Control-Constant stick pres. & reduced throttle
Motion-Constant positive G, pitch & roll stabilized</td><td></td><td>Cp-10(D) 67.<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL, TH
AI, RU</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines need to relax stick pres. & reduce throttle as roll out of turn begins</td><td></td></tr>
</table>

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-10 **TASK** Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns away from wingman **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(D) 3.	STARTS ROLL OUT OF TURN, BACK TO STRAIGHT & LEVEL FLIGHT		Reduces elevator pressure, adjusts throttle, maintains aileron & rudder control pressure
(E) 1.	CONTINUES ROLL OUT OF TURN Visual-Pitch att:descending Bank att: rolling Outside ref:changing longitudinal & vertical reference Aural-Normal envir. sound Control-Increased stick pres. & reduced throttle Motion-Decreasing positive G, pitching down, rolling		Cp10(E) 87. 1 V CM 5-C T-8 2 L-2 RP CT 3 EA TH, AI RU, EL R-2
2.		Anticipates rate of roll out to decrease as wings level position is reached & need to adjust throttle accordingly	
3.			Adjusts throttle; maintains aileron, rudder & elevator control pressure
(F) 1.	ROLL OUT OF TURN COMPLETED Visual-Pitch att: cruise Bank att: level Outside reference: longitudinal & vertical references constant Aural-Normal envir. sound Control-Constant stick pres. & throttle adjustment Motion-Normal G		Cp-10(F) 0. 1 V C 2-C T-5 2 L-1 MC ST 3 EA — —

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-10 **TASK** Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns away from wingman **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(F)	ROLL OUT OF TURN COMPLETED		
2.		Determines roll out turn completed & goal achieved	
3.			Maintains aileron, rudder & elevator control pressure; adjusts throttle
	NOTE: NO STEADY-STATE CAN BE ACHIEVED DURING CLCSE FORMATION		
*	Formation flying requires constant control pressures		

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-11 **TASK** Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns into wingman **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	MAINTAINS FINGERTIP FORMATION		
1.	Visual-Pitch att: cruise Bank att: level Outside reference: lead aircraft longitudinal & vertical position references constant Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal G		Cp-11 (A) 12. 1 V C | 2-C | T-4 2 L-2 | RP | SJ 3 EA | RU AI EL, TH | R-2
2.		Anticipates turn will be made away from or into wingman, & need to increase or decrease power & back pressure accordingly	
3.			* Maintains rudder, aileron & elevator control pressure; adjusts throttle
(B)	LEAD AIRCRAFT BEGINS TURN INTO WINGMAN		
1.	Visual-Pitch att: cruise Bank att: level Outside reference: lead aircraft longitudinal & vertical references change Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal positive G.		Cp11 (B) 75. 1 V C | 2-C | T-4 2 L-4 | MC | SJ 3 ER | EL TH 3 RU, AI | R-5
2.		Determines turn into wingman & need to decrease power & relax stick pres. to maintain relative position	
3.			Coordinates elevator & throttle adjustment, maintains aileron & rudder control pres.

* Formation flying requires constant control pressures

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-11 **TASK** Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns into wingman **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)
1.</td><td>MAINTAINS CONSTANT RATE TURN
Visual-Pitch att: changing
Bank att: rolling
Outside reference: longitudinal & vertical refs. constant
Aural-Normal envir. sound
Control-Decreased elevator pressure, increased aileron & rudder, reduced throttle
Motion-Positive G onset, pitching down, rolling</td><td></td><td>Cp11 (C) 30.<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-10</td></tr><tr><td>2</td><td>L-4</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>EL
TH
AI, RU</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines fingertip position being maintained, need to add power, & increase back pressure to maintain position</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates elevator & throttle adjustment, Maintains aileron & rudder control pres.</td></tr>
<tr><td>(D)
1.</td><td>STARTS ROLL OUT OF TURN, BACK TO STRAIGHT & LEVEL FLIGHT
Visual-Pitch att: constant
Bank att: constant
Outside ref: longitudinal & vertical references change
Aural-Normal envir. sound
Control-Constant stick pres. throttle advance
Motion-Constant positive G, pitching stabilized rolling stabilized</td><td></td><td>Cp-11 (D) 67.<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL, TH
AI, RU</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines need to increase back pres., & increase power as roll out of turn begins</td><td></td></tr>
</table>

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-11 **TASK** Fingertip Formation

TASK GOAL To maintain fingertip formation while lead turns into wingman **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(D) 3.	STARTS ROLL OUT OF TURN, BACK TO STRAIGHT & LEVEL FLIGHT		Moves elevator & adjusts throttle, maintains aileron & rudder control pressure
(E) 1.	CONTINUES ROLL OUT OF TURN Visual-Pitch att: increasing Bank att: rolling Outside ref:changing longitudinal & vertical references Aural-Normal envir. sound Control-Increased stick pres, & reduced throttle Motion-Decreasing positive G, pitching up, rolling		CP11 (E) 7. 1 ✓CM 3-C T-8 2 L-2 RP SJ 3 EA TH, AI RU, EL R-2
2.		Anticipates rate of roll out to decrease as wings level position is reached, & need to adjust throttle accordingly	
3.			Adjusts throttle; maintains aileron, rudder & elevator control pressure
(F) 1.	ROLL OUT OF TURN COMPLETED Visual-Pitch att: cruise Bank att: level Outside ref:longitudinal & vertical references constant Aural-Normal envir. sound Control-Constant stick pres, throttle adjustment Motion-Normal positive G		CP11 (F) 32. 1 ✓C 2-C T-5 2 L-2 MC SJ 3 EA AI, EL RU TH R-2
2.	NOTE: NO STEADY-STATE CAN BE ACHIEVED DURING CLOSE FORMATION	Determines roll out of turn complete & goal achieved	
3.			Maintains aileron, rudder & elevator; adjusts throttle

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-12 **TASK** Cross Under

TASK GOAL Cross under lead aircraft **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	FINGERTIP FORMATION Visual-Pitch att: cruise Bank att: level Outside ref: lead aircraft longitudinal & vertical position references constant Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal G		Cp-12 (A) 12. 1 ✓C 2-C T-4 2 L-2 RP SJ 3 EA AI, RU EL, TH R-2
2.		Anticipates cross under signal	
3.			* Maintains aileron, rudder & elevator; throttle adjustment
(B) 1.	LEAD AIRCRAFT GIVES CROSS UNDER SIGNAL Visual-Pitch att: cruise Bank att: level Outside ref: lead aircraft dips wing in direction to cross under Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal positive G		Cp-12 (B) 75. 1 ✓C 2-C T-4 2 L-4 MC SJ 3 ER EL TH } AI, RU R-5
2.		Determines direction of change, need to reduce power, & lower position from that of normal fingertip	
3.			Coordinates elevator & throttle adjustment, maintains aileron & rudder control pres.
*	Formation flying requires constant control pressures		

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-12 **TASK** Cross Under

TASK GOAL Cross under lead aircraft **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)
1.</td><td>CONTINUES MANEUVER
Visual-Pitch att: changing
Bank att: level
Outside ref:longitudinal & vertical references change
Aural-Normal envir. sound
Control-Increased stick pres, & reduced throttle
Motion-Normal G, pitching down</td><td></td><td>Cp-12(C) 27<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>RU, AI
EL, TH</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines need to move aft far enough to obtain nose/tail clearance, & need to push up power (so as not to slip too far back behind lead)</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains aileron, rudder & elevator control pressure; adjusts throttle</td></tr>
<tr><td>(D)
1.</td><td>CONTINUES MANEUVER
Visual-Pitch att: cruise
Bank att: level
Outside ref:nose/tail clearance approaching
Aural-Normal envir. sound
Control-Increased stick pres. & throttle advance
Motion-Normal G</td><td></td><td>Cp-12(D) 75.<table><tr><td>1</td><td>V
C</td><td>2-C</td><td>T-5</td></tr><tr><td>2</td><td>L-4</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>AI
RU
EL, TH</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines aft movement stopped, nose/tail clearance achieved, & anticipates a shallow bank to chg heading</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder, maintains elevator control pres. & adjusts throttle</td></tr>
</table>

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-12 **TASK** Cross Under

TASK GOAL Cross under lead aircraft **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	AIRCRAFT BEGINS TO CROSS UNDER		Cp-12(E) 30. 1 V CM · 3-C · T-5 2 L-A · MC · SJ 3 EA · AI RU } EL, TH · R-5
1.	Visual-Pitch att: cruise Bank att: changing Outside ref: changing with aircraft lateral movement Aural-Normal envir. sound Control-Increased stick pres. Motion-Normal G, rolling		
2.		Determines need to roll out of shallow bank, wings level; & to add power to maintain nose/tail clearance	
3.			Coordinates aileron & rudder, maintains elevator pressure control & adjusts throttle
(F)	CROSS UNDER CONTINUES		Cp-12 (F) 65. 1 VA CM · 4C · T-7 2 L-4 · MC · SJ 3 ER · AI RU EL } ~~TH~~ · R-5
1.	Visual-Pitch att: cruise Bank att: level Outside ref:changing adequate separation between aircraft Aural-Change in envir. sound Control-Increased stick pres, throttle advance Motion-Normal G, roll stabilized		
2.		Determines wingtip clearance, need to return aircraft to lead aircraft's heading & increase power	
3.			Coordinates aileron, rudder & elevator control pressure; adjusts throttle

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-12 **TASK** Cross Under

TASK GOAL Cross under lead aircraft **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G)	MOVES UP INTO POSITION		Cp-12(G) 65 1 VA CM 4-C T-7 2 L-4 MC SJ 3 ER AI RU/EL TH R-5
1.	Visual-Pitch att: cruise Bank att: changing Outside ref: longitudinal & vertical references change Aural-Change in envir. sound Control-Increased stick pres. & throttle advance Motion-Normal G, rolling		
2.		Determines need to roll out of shallow bank & increase power to move up into position	
3.			Coordinates aileron & rudder, maintains elevator, adjusts throttle
(H)	FINGERTIP POSITION REACHED ON OPPOSITE SIDE OF LEAD AIRCRAFT		Cp-12(H) 7 1 V CM 3-C T-6 2 L-4 RP SJ 3 EA AI RU/EL,TH R-2
1.	Visual-Pitch att: cruise Bank att: changing Outside ref: longitudinal & vertical references changing Aural-Normal envir. sound Control-Increased stick pres. & throttle advance Motion-Normal G, rolling		
2.		Anticipates reaching fingertip position, need to decrease stick pressure, & reduce throttle	
3.			Relaxes elevator, adjusts throttle, maintains aileron & rudder control pressure

SITUATION Two-aircraft element, cruise power, fingertip formation

TASK NO. Cp-12 **TASK** Cross Under

TASK GOAL Cross under lead aircraft **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(I) 1.	FINGERTIP FORMATION REGAINED Visual-Pitch att: cruise Bank att: level Outside ref:longitudinal & vertical references constant Aural-Normal envir. sound Control-Constant stick pres. reduced throttle Motion-Normal G		
2.		Determines goal of cross under achieved, fingertip position regained	
3.			Maintains aileron, rudder & elevator control pressure; throttle adjustment
	NOTE: NO STEADY-STATE CAN BE ACHIEVED DURING CLOSE FORMATION		

Cp-12 (I) 32

1	V C	2-C	T-4
2	L-2	MC	SJ
3	EA	AI, RU EL, TH	R-2

SITUATION Two-aircraft element, wingman in trail after a 4-second interval

TASK NO. Cp-13 **TASK** Rejoin after pitch out

TASK GOAL To rejoin leader after pitch out **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(A)
1.</td><td>LEAD AIRCRAFT GIVES REJOIN SIGNAL
Visual-Pitch att: cruise
Bank att: level
Outside reference: lead aircraft
Instr. cross-check
Aural-Normal envir. sound
Control-Constant pressure
Motion-Normal G</td><td></td><td>Cp-13 (A) 55.<table><tr><td>1</td><td>V
C</td><td>2-C</td><td>T-5</td></tr><tr><td>2</td><td>L-4</td><td>RP</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>[illegible]
TM</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates turn & need to establish cutoff angle right away</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron, rudder & elevator movements; adjusts throttle</td></tr>
<tr><td>(B)
1.</td><td>BEGINS TURN
Visual-Pitch att: cruise
Bank att: rolling
Outside reference: lead starts turn
Aural-Change in envir. sound
Control-Stick & rudder pres., throttle adjustment
Motion-Positive G onset, rolling</td><td></td><td>Cp-13 (B) 142.<table><tr><td>1</td><td>VA
CM</td><td>4-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL
AI
RV</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines amount of angle off req'd, & need to descend slightly to get below lead's altitude</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Moves elevator, maintains aileron & rudder pressure</td></tr>
<tr><td>(C)
1.</td><td>TURN TO OBTAIN NEEDED CUTOFF ANGLE CONTINUES
Visual-Pitch att: decreasing
Bank att: constant
Outside ref: lead aircraft vertical stabilizer & outside wing</td><td></td><td></td></tr>
</table>

SITUATION Two-aircraft element, wingman in trail after a 4-second interval

TASK NO. Cp-13 TASK Rejoin after pitch out

TASK GOAL To rejoin leader after pitch out DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	TURN TO OBTAIN NEEDED CUTOFF	ANGLE CONTINUES	
1.	Aural-Normal envir. sound Control-Stick & rudder pres. Motion-Constant positive G, rolling stabilized, pitching down		Cp-13 (C) 107 1 V CM 3-C T-8 2 L-2 MC SJ 3 EA EL RV R-2
2.		Determines safe altitude below lead reached & desired cutoff angle achv'd	
3.			Maintains elevator & rudder pressure
(D)	CUTOFF CONTINUES		
1.	Visual-Pitch att: constant Bank att: constant Outside ref: lead aircraft vertical stabilizer & outside wing Instr. cross-check Aural-Normal envir. sound Control-Constant stick & rudder pressure Motion-Constant positive G, pitch stabilized		Cp-13 (D) 168 1 V CM 3-C T-8 2 L-2 IP SJ 3 EA EL R-1
2.		Sustains satisfactory angle off position	
3.			Maintains elevator pressure
(E)	CUTOFF ANGLE INCREASES		
1.	Visual-Pitch att: cruise Bank att: constant Outside ref: vertical stabilizer moves toward wingtip Aural-Normal envir. sound Control-Constant stick pres. Motion-Constant positive G		Cp-13 (E) 148 1 V CM 3-C T-5 2 L-3 MC CJ 3 ER AI RV } R-3

SITUATION Two-aircraft element, wingman in trail after a 4-second interval

TASK NO. Cp-13 TASK Rejoin after pitch out

TASK GOAL To rejoin leader after pitch out DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	CUTOFF ANGLE INCREASES		
2.		Determines cutoff angle increasing & the need to shallow bank	
3.			Coordinates aileron & rudder pressure
(F)	CUTOFF CONTINUES		Cp13 (F) 129.
1.	Visual-Pitch att: cruise Bank att: rolling Outside ref: movement of vertical stabilizer toward wingtip diminishes Aural-Normal envir. sound Control-Aileron, rudder & elevator pressure Motion-Decreasing positive G, rolling		1 V CM 3-C T-8 2 L-3 RP CJ 3 ER AI RU EL R-4
2.		Anticipates correct cutoff angle approaching	
3.			Coordinates aileron, rudder & elevator
(G)	CUTOFF CONTINUES		Cp-13 (G) 68
1.	Visual-Pitch att: cruise Bank att: rolling Outside ref: vertical stabilizer moves toward wing root Aural-Normal envir. sound Control-Constant stick pres. Motion-Constant positive G, rolling		1 V CM 5-C T-6 2 L-3 MC SJ 3 ER AI RU EL R4
2.		Determines cutoff angle is decreasing & need to increase bank angle	

SITUATION Two-aircraft element, wingman in trail after a 4-second interval

TASK NO. Cp-13 **TASK** Rejoin after pitch out

TASK GOAL To rejoin leader after pitch out **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G)	CUTOFF CONTINUES		
3.			Coordinates aileron, rudder & elevator
(H)	JOIN UP APPROACHING		Cp-13 (H) 169 1 V CM 3-C T-6 2 L-2 1P SJ 3 EA EL/RU R-2
1.	Visual-Pitch att: cruise Bank att: rolling Outside ref: movement of vertical stabilizer toward wing root diminishes Aural-Normal envir. sound Control-Increased stick pres. Motion-Increasing positive G, rolling		
2.		Sustains satisfactory cutoff angle	
3.			Maintains elevator & rudder pressure
(I)	CONTINUES JOIN UP		Cp-13 (I) 164 1 V CM 3-C T-7 2 L-4 SC SJ 3 ER AL/RU/EL/TH R-5
1.	Visual-Pitch att: cruise Bank att: constant Outside ref: longitudinal & vertical references Aural-Normal envir. sound Control-Constant stick & rudder pressure Motion-Constant positive G, roll stabilized		
2.		Observes position to be behind normal fingertip position & need to move in to lead by varying power & bank angle	
3.			Coordinates aileron, rudder & elevator pressure; adjusts throttle

SITUATION Two-aircraft element, wingman in trail after a 4-second interval

TASK NO. Cp-13 TASK Rejoin after pitch out

TASK GOAL To rejoin leader after pitch out DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J) 1.	CONTINUES JOIN UP Visual-Pitch att: changing Bank att: rolling Outside ref: longitudinal & vertical references change Aural-Change in envir. sound Control-Increased stick pres. & throttle adjustment Motion-Decreasing positive G, pitching, rolling		Cp-13(J) 45. 1 VA CM · 4C · T-9 2 L-4 · RP · SJ 3 ER · AI RU EL TH · R-5
2.		Anticipates join up with leader & need to keep relative position below lead aircraft, adjusts throttle	
3.			Coordinates aileron, rudder & elevator; adjusts throttle
(K) 1.	MOVES INTO FINGERTIP POSITION Visual-Pitch att: changing Bank att: rolling Outside ref: longitudinal & vertical references Aural-Change in envir. sound Control-Stick & rudder pres., throttle reduced Motion-Constant positive G, pitching, rolling		Cp-13 (K) 102. 1 VA CM · 4C · T-10 2 L-2 · MC · CJ 3 EA · TH, AI RU, EL · R-2
2.		Determines that co-speed & relative fingertip position approaching, need to adjust power	
3.			Adjusts throttle; maintains aileron, rudder & elevator control pressure

SITUATION Two-aircraft element, wingman in trail after a 4-second interval

TASK NO. Cp-13 TASK Rejoin after pitch out

TASK GOAL To rejoin leader after pitch out DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L)	REJOIN INTO FINGERTIP COMPLETED		
1.	Visual-Pitch att: cruise Bank att: constant Outside ref: longitudinal & vertical references constant Aural-Normal envir. sound Control-Constant stick pres., throttle advanced Motion-Constant positive G,		
2.		Determines fingertip position achv'd & join up completed	
3.			* Maintains aileron, rudder, elevator & throttle adjustment
*	Formation flying requires constant control pressures NOTE: NO STEADY-STATE CAN BE ACHIEVED DURING CLOSE FORMATION		

Cp-13 (L) 32

1	V C	2-C	T-6
2	L-2	MC	SJ
3	EA	AI, RU EL, TH	R-2

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 **TASK** Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS PRE-ENTRY ACCELERATION Visual-Pitch att: cruise Bank att: level Outside reference: section line Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Ct-1(A) 161. 1 V 1-C T-5 2 L-3 SC SJ 3 EC EL TH R-3
2.		**Observes** position to commence descent & increase throttle	
3.			Coordinates elevator movement & throttle adjustment
(B) 1.	STARTS SHALLOW DIVE Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure; throttle adv. Motion- **Negative** G onset, acceleration, pitching down		Ct-1 (B) 102. 1 V A C M A-C T-10 2 L-2 MC CJ 3 EA EL TR R-2
2.		Determines satisf. descent attitude; need for trim	
3.			Maintains elevator pressure & adjusts trim
(C) 1.	BEGINS RETURN TO LEVEL FLIGHT Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 **TASK** Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane **DATE** Oct., 1973

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)</td><td>BEGINS RETURN TO LEVEL FLIGHT</td><td></td><td rowspan="2">Ct-1(C) 66.<table><tr><td>1</td><td>VC
M</td><td>3-C</td><td>T-6</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Control-Neutral stick pres.
Motion-Normal G;acceleration</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines proper airspeed at return to straight and level flight</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Moves elevator</td></tr>
<tr><td>(D)</td><td>STARTS PULLUP</td><td></td><td rowspan="2">Ct-1(D) 126.<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>RP</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att:increasing
Bank att: level
Outside reference: horizon
Instr. cross-check
Aural-Normal envir. sound
Control-Increased stick pres.
Motion-Positive G onset; pitching up</td><td></td></tr>
<tr><td>2.</td><td></td><td>Anticipates a constant back pressure (to maintain a constant rate of nose movement)</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Increases elevator pressure</td></tr>
<tr><td>(E)</td><td>CONTINUES PULLUP</td><td></td><td rowspan="2">Ct-1(E) 142.<table><tr><td>1</td><td>VC
AM</td><td>4-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>AI
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att:increasing
Bank att: level
Outside reference: horizon
Aural-Change in envir. sound
Control-Increased stick pres.
Motion-Increasing positive G; pitching up</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines satisf. rate of nose movement & desired seat pressure</td><td></td></tr>
</table>

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 **TASK** Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E) 3.	CONTINUES PULLUP		Maintains aileron position & increases elevator pressure
(F) 1.	CONTINUES PULLUP TO VERTICAL POSITION Visual-Pitch att: increasing Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick pres Motion-Constant positive G, pitching up		Ct-1(F) 121. 1 VA OM · Al · T-7 2 L-2 · RP · CJ 3 ER · EL · R-1
2.		Anticipates nose reaching & passing through zenith	
3.			Relaxes elevator pressure
(G) 1.	CONTINUOUS MANEUVER OVER-THE-TOP Visual-Pitch att: at zenith Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching up		Ct-1 (G) 141. 1 VA CM · Al · T-8 2 L-2 · MC · CJ 3 ER · EL · R-1
2.		Determines satisf. rate of nose movement & constant seat pressure	
3.			Increases elevator pressure

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 TASK Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane DATE Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(H)	CONTINUES MANEUVER DOWN THE BACK SIDE, INVERTED		Ct-1(H) 41. 1 VA CM AC T-P 2 L-2 RP SJ 3 ER EL R-1
1.	Visual-Pitch att:decreasing (inverted) Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching down, acceleration		
2.		Anticipates relaxing back pressure slightly at inverted position as nose passes through horizon	
3.			Relaxes elevator movement slightly
(I)	CONTINUES MANEUVER INTO DIVE		Ct-1(I) 144. 1 VA CM A-1 T-8 2 L-2 MC CJ 3 ER EL R-1
1.	Visual-Pitch att: wings level (inverted) Bank att: level Outside reference: horizon Aural-Change in envir. sound Control-Decreased elevator pressure Motion-Decrease in positive G; pitching down		
2.		Determines need for increased stick pressure to return to constant seat pressure	
3.			Moves elevator

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 **TASK** Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J)	CONTINUES TO A DIVE		Ct-1(J) 144.
1.	Visual-Pitch att: dive Bank att: level Outside reference Aural-Change in envir. sound Control-Increased elevator pressure Motion-Constant positive G, pitching down, acceleration		1 VA CM AC T-8 2 L-3 MC CJ 3 ER EL AI RU } R-4
2.		Determines satisf. wings level nose movement; continuation of desired seat pressure	
3.			Maintains coordinated elevator, aileron & rudder pressure
(K)	CONTINUES THROUGH NADIR POSITION		Ct-1(K) 45.
1.	Visual-Pitch att:increasing Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound Control-Constant elevator pressure Motion-Constant positive G, pitching up, acceleration		1 VA CM AC T-9 2 L-4 RP SJ 3 ER EL RU / EL R-5
2.		Anticipates nose passing through nadir	
3.			Maintains coordinated elevator, aileron & rudder pressure

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 **TASK** Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L)	CONTINUES PULLUP TO STRAIGHT AND LEVEL FLIGHT		Ct-1(L) 41. 1 VA CM 4C T-8 2 L-2 RP SJ 3 EE EL R-1
1.	Visual-Pitch att:increasing Bank att: level Outside reference: section line Aural-Change in envir. sound Control-Constant elevator pressure Motion-Constant positive G, pitching up, acceleration		
2.		Anticipates return to straight & level flight, & need to relax elevator pressure	
3.			Relaxes elevator pressure
(M)	TRANSITION TO STRAIGHT AND LEVEL FLIGHT		Ct-1(M) 5 1 VA CM 4-C T-7 2 L-4 RP SJ 3 EA EL A/RUS R-5
1.	Visual-Pitch att:increasing Bank att: level Outside reference Aural-Change in envir. sound Control-Decreases elevator pressure Motion-Decreasing positive G, pitching up		
2.		Anticipates approaching straight & level flight	
3.			Coordinates elevator, aileron & rudder pressure

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-1 **TASK** Straight and level/transition thru a loop

TASK GOAL To perform a 360° turn in the vertical plane **DATE** Oct., 1973

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(N)	STOPS LOOP		G-1(N) 32 1 V/C 2-C T-4 2 L-2 MC SJ 3 EA TR/EL R-2
1.	Visual-Pitch att: cruise Bank att: level Outside reference Aural-Normal envir. sourd Control-Constant elevator pressure Motion-Normal G		
2.		Determines trim required	
3.			Adjusts trim; & relaxes elevator pressure
(O)	ESTABLISHES STEADY-STATE		G-1(O) 0. 1 V 1-C T-2 2 L-1 MC SJ 3 EA — —
1.	Visual-Pitch att: cruise Bank att: level Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal G		
2.		Determines loop accomplished	
3.			Maintains cruise control

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 TASK Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	ATTAIN ENTRY AIRSPEED		Ct-2 (A) 162 1 V 1-C T-3 2 L-4 SC SJ 3 ER A/ RU EL R-5
1.	Visual-Pitch att: cruise Bank att: level Outside reference Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		
2.		**Observes position** to commence dive for entry airspeed	
3.			Coordinates aileron & rudder, **moves** elevator
(B)	BEGINS ENTRY (obtains maneuver airspeed with nose below reference point & starts turn)		Ct-2 (B) 49 1 V CM 3-C T-10 2 L-3 RP SJ 3 ER A/ RU EL } R-4
1.	Visual-Pitch att: descent Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Increased aileron, rudder & elevator pressure Motion-**Negative G onset, pitching down,** acceleration		
2.		Anticipates maneuver entry airspeed & start of turn in the opposite direction of the roll	
3.			Coordinates aileron, rudder & elevator pressure

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 **TASK** Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	CONTINUES ENTRY		Ct-2(C) 149. 1 VC M · 3-C · T-9 2 L-3 · MC · CJ 3 ER · AI RU EL } · L-4
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Increased stick & rudder pressure Motion-Positive G onset, rolling, pitching		
2.		Determines satisfactory roll rate	
3.			Maintains coordinated aileron, rudder & elevator pressure
(D)	CONTINUES ENTRY (20°-30° reference angle obtained, roll out & start of nose rising)		Ct-2 (D) 150. 1 V C M · 3-C · T-10 2 L-4 · MC · CJ 3 ER · AI RU } EL · R-5
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Instr. cross-check Aural-Normal envir. sound Control-Constant aileron, rudder, & elevator pressure Motion-Increasing positive G, rolling, pitching		
2.		Determines proper angle-off reference point approaching & slow rate of roll out required	
3.			Coordinates aileron & rudder, increases elevator pressure

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 **TASK** Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E)	STARTS PULL UP & ROLL (opposite direction from initial turn)		Ct-2 (E) 129. 1 V CM 3-C T-10 2 L-3 RP CJ 3 ER Al RU EL } R-4
1.	Visual-Pitch att: increases Bank att: rolling, level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Increased aileron, rudder & elevator pressure Motion-Increasing positive G, rolling, pitching up		
2.		Anticipates having wings level att. at level flight attitude	
3.			Maintains coordinated aileron, rudder & elevator pressure
(F)	CONTINUES PULL UP & ROLL (constant roll rate around visual reference)		Ct-2 (F) 144. 1 VA CM 4-C T-10 2 L-3 MC CJ 3 ER Al RU EL } R4
1.	Visual-Pitch att:increasing Bank att: rolling Outside reference Aural-Change in envir. sound Control-Increased aileron, rudder & elevator pressure Motion-Increasing positive G, rolling, pitching up		
2.		Determines satisf. roll rate achieved	
3.			Maintains coordinated aileron, rudder & elevator pressure

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 **TASK** Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(G)	CONTINUES MANEUVER (Approaches vertical position)		Ct-2 (G) 12A. 1 VA CM 4-C F11 2 L-2 RP CJ 3 ER AI RU EL R-2
1.	Visual-Pitch att: climbing Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant aileron & rudder pressure, increased elevator pressure Motion-Constant positive G, rolling, pitching up		
2.		Anticipates reaching wings vertical attitude at highest point above outside reference & relaxing back pressure & increasing aileron	
3.			Increases aileron & rudder pressure, relaxes elevator pressure slightly
(H)	CONTINUES MANEUVER (to wings level, inverted position)		Ct-2 (H) 14E 1 VA CM 4-C F-10 2 L-4 MC CJ 3 ER AI RU EL R-5
1.	Visual-Pitch att: climbing Bank att: rolling Outside reference Aural-Change in envir. sound Control-Increased aileron & rudder pressure, decreased elevator pressure Motion-Constant positive G, rolling, pitching		

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 TASK Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(H)	CONTINUES MANEUVER (to wings level, inverted position)		
2.		Determines roll rate satisfactory to reach inverted pt. wings level, nose track same distance from ref. point	
3.			Coordinates aileron & rudder pressure, maintains elevator pressure
(I)	CONTINUES ROLL MANEUVER (to vertical position at bottom of ref. point)		
1.	Visual-Pitch att: level, inverted Bank att: rolling Outside reference: nose track Aural-Change in envir. sound Control-Increased aileron & rudder pressure, decreased elevator pressure Motion-Constant positive G, rolling, pitching inverted		
2.		Anticipates reaching vertical position & need for increased back pressure	
3.			Maintains aileron & rudder pressure, increases back pressure

Ct-2 (I) 1AA

1	VA CM	4C	T-10
2	L-2	RP	CJ
3	BR	AI [illegible] [illegible]	B-2

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 **TASK** Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J)	CONTINUES MANEUVER TO COMPLETION POINT		
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Changing envir. sound Control-Constant aileron & rudder pressure, increased elevator pressure Motion-Constant positive G, rolling, pitching		Ct-2(J) [illegible] 1 VA CM | 4-C | F-10 2 L-3 | MC | CJ 3 ER | A/ [illegible] } | R-4
2.		Determines roll rate constant, need for increased aileron & elevator pressure	
3.			Coordinates increased aileron, rudder & elevator pressure
(K)	COMPLETION POINT REACHED & ROLL OUT STARTED		
1.	Visual-Pitch att: increasing Bank att: rolling Outside reference Aural-Change in envir. sound Control-Increased aileron, rudder & elevator pressure Motion-Constant positive G, pitching up, rolling		Ct-2(K) 144 1 VA CM | 4C | F-10 2 L-3 | MC | CJ 3 ER | A/ [illegible] } | R-4
2.		Determines roll out point reached.(To achieve 20°-30° ref. point from which roll began)	
3.			Coordinates decreased aileron, rudder & elevator pressure to effect roll out

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-2 **TASK** Straight & level/transition thru a barrel roll

TASK GOAL To perform a 360° roll around a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L) 1.	STOPS ROLL Visual-Pitch att:increasing Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Decreasing aileron, rudder & elevator pressure Motion-Decreasing positive G, pitching up, rolling		Ct-2 (L) 21. 1 VA CM 4C T-11 2 L-2 MC SJ 3 EA TR EL R-2
2.		Determines desired reference point reached, wings level	
3.			Adjusts trim & relaxes elevator pressure
(M) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: cruise Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral aileron, rudder & elevator pressure Motion-Normal G		Ct-2(M) 0. 1 V 1-C T-4 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-3 **TASK** Straight & level/transition thru an aileron roll

TASK GOAL To perform a 360° roll on a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS PRE-ENTRY ACCELERATION		
1.	Visual-Pitch att: cruise Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Ct-3 (A) 36. 1 V 1-C T-4 2 L-1 MC SJ 3 EA TH R-1
2.		Determines need to accelerate	
3.			Adjusts throttle
(B)	AIRSPEED OBTAINED, STARTS MANEUVER		
1.	Visual-Pitch att: cruise Bank att: level Instr. cross-check Aural-Chg in envir. sound Control-Neutral pressure, advances throttle Motion-Normal G,acceleration		Ct-3 [illegible] 61. 1 VA BH 4-C T-6 2 L-2 MC SJ 3 ER EL R-1
2.		Determines proper entry airspeed to start maneuver	
3.			Moves elevator
(C)	BEGINS ROLL		
1.	Visual-Pitch att: increases Bank att: level Outside reference Aural-Normal envir. sound Control-Increased stick pres. Motion-Normal G, pitching up		Ct-3 (C) 60. 1 V CH 3-C T-5 2 L-4 RP SJ 3 ER [illegible] EL R-5
2.		Anticipates rolling aircraft	
3.			Coordinates aileron & rudder, relaxes elevator

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-3 **TASK** Straight & level/transition thru an aileron roll

TASK GOAL To perform a 360° roll on a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(D) 1.	CONTINUES ROLL Visual-Pitch att: changing Bank att: rolling Outside reference Aural-Normal envir. sound Control-Increased aileron & rudder pressure, decreased stick pres. Motion-Normal G, pitching, rolling		Ct-3 (D) 148 1 V CM 3-C T-8 2 L-3 MC CJ 3 ER Al RU} R-3
2.		Determines desired roll rate achv'd.	
3.			Maintains coordinated aileron & rudder
(E) 1.	CONTINUES ROLL Visual-Pitch att: changing Bank att: rolling Outside reference Aural-Normal envir. sound Control-Constant aileron, rudder & elevator pressure Motion-Normal G, pitching, rolling		Ct-3 (E) 129 1 V CM 3-C T-8 2 L-3 RP CJ 3 ER Al RU EL} R-4
2.		Anticipates increased control pressure required	
3.			Coordinates aileron, rudder & elevator pressure
(F) 1.	STOPS ROLL Visual-Pitch att: changing Bank att: rolling Outside reference Aural-Normal envir. sound Control-Increased aileron, rudder & elevator pressure Motion-Normal G, pitching, rolling		Ct-3 (F) 129. 1 V CM 3-C T-8 2 L-3 RP CJ 3 ER Al RU EL} R-4

SITUATION Aircraft positioned on section line, straight & level flight, cruise power

TASK NO. Ct-3 **TASK** Straight & level/transition thru an aileron roll

TASK GOAL To perform a 360° roll on a fixed horizontal reference **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(F)	STOPS ROLL		
2.		Anticipates wings level attitude approaching	
3.			Coordinates aileron, rudder & elevator to commence roll out
(G)	RETURNS TO WINGS LEVEL ATTITUDE		Ct-3 (G) 108. 1 · V CM · 3-C · T-8 2 · L-2 · MC · CJ 3 · EA · AI RU EL · R-3
1.	Visual-Pitch att: changing Bank att: rolling Outside reference Aural-Normal envir. sound Control-Decreased aileron, rudder & elevator pressure Motion-Normal G, pitching, rolling		
2.		Determines roll out rate satisfactory	
3.			Relaxes aileron, rudder & elevator
(H)	ESTABLISHES STEADY-STATE		Ct-3(H) 0. 1 · V · 1-C · T-5 2 · L-1 · MC · SJ 3 · EA · — · —
1.	Visual-Pitch att: cruise Bank att: wings level Outside reference Aural-Normal envir. sound Control-Neutral stick & rudder pressure Motion-Normal G		
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Ct-4 [illegible] Cloverleaf

TASK GOAL To perform a cloverleaf DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS ENTRY ACCELERATION Visual-Pitch att: cruise Bank att: level Outside reference: section line Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		[illegible] Nil. V HC T-3 L-3 SR ST [illegible] [illegible] R-3
2.		Observes point to commence descent & increase throttle slightly	
3.			Coordinates elevator movement with throttle adjustment
(B) 1.	STARTS SHALLOW DIVE Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. & throttle advance Motion-Negative G onset, acceleration, pitching down		[illegible] ma. VA CN 4C T-10 L-2 HC G[illegible] EH EL TR R[illegible]
2.		Determines satisf. descent attitude & need for trim	
3.			Maintains elevator pressure & adjusts trim
(C) 1.	BEGINS RETURN TO LEVEL FLIGHT Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check		

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Ct-4 **TASK** Cloverleaf

TASK GOAL To perform a cloverleaf **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C) 1.	BEGINS RETURN TO LEVEL FLIGHT Aural-Change in envir. sound Control-Neutral stick pres. Motion-Normal G, acceleration		Ct-4 (C) 66. 1 VA M | 3-C | T-6 2 L-2 | MC | ST 3 ER | EL | R-1
2.		Determines proper airspeed at return to straight & level flight	
3.			Moves elevator
(D) 1.	STARTS PULL UP Visual-Pitch att: increasing Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Positive G onset, pitching up		Ct-4 (D) 147. 1 VC M | 3-C | T-7 2 L-2 | MC | CT 3 ER | EL TH | R-2
2.		Determines satisf. rate of nose movement, required acceleration schedule approaching & need for throttle	
3.			Increases elevator pressure & adjusts throttle
(E) 1.	CONTINUES PULL UP Visual-Pitch att: increasing Bank att: level Outside reference Instr. cross-check Aural-Changing envir. sound Control-Increased stick pres. & throttle advance Motion-Constant positive G, pitching up		Ct-4 (E) 142. 1 VA CM | 4-C | T-9 2 L-2 | MC | CT 3 ER | AI EL | R-2

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Ct-4 TASK Cloverleaf

TASK GOAL To perform a cloverleaf DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E) 2.	CONTINUES PULL UP	Determines wings level, constant rate of nose movement & acceleration schedule	
3.			Maintains aileron & increases elevator pressure
(F) 1.	CONTINUES PULL UP TO ROLL POSITION Visual-Pitch att: increasing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching up		Ct-4 (F) 125. 1 | VA CM | 4-8 | T-8 2 | L-4 | RP | CJ 3 | ER | AI RU EL | R-5
2.		Anticipates beginning a coordinated roll toward a selected reference point at 45° of pitch	
3.			Coordinates aileron & rudder, maintains elevator pressure
(G) 1.	STARTS ROLL WHILE CLIMBING Visual-Pitch att: increasing Bank att: rolling Outside reference Aural-Change in envir. sound Control-Increased stick & rudder pressure Motion-Constant positive G, pitching up, rolling		Ct-4 (G) 144. 1 | VA CM | 4-C | T-9 2 | L-3 | MC | CJ 3 | ER | AI RU EL | R-4
2.		Determines rate of roll & nose movement satisfactory	

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Ct-4 **TASK** Cloverleaf

TASK GOAL To perform a cloverleaf **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(G)</td><td>STARTS ROLL WHILE CLIMBING</td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains coordinated aileron,rudder & elevator pressure</td></tr>
<tr><td>(H)</td><td>CONTINUES ROLLING OVER THE TOP</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: climbing
Bank att: rolling
Outside reference: section line
Aural-Change in envir. sound
Control-Constant stick pres.
Motion-Constant positive G, pitching down,rolling</td><td></td><td>Ct-4(H) 142<table><tr><td>1</td><td>VA
CH</td><td>AC</td><td>F-8</td></tr><tr><td>2</td><td>L-4</td><td>AC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>[illegible]</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines need to start roll out to reach inverted position wings level</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder, relaxes elevator pressure slightly</td></tr>
<tr><td>(I)</td><td>INVERTED WINGS LEVEL POSITION APPROACHING</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att:descending, inverted
Bank att: rolling
Outside reference: section line
Instr. cross-check
Aural-Change in envir. sound
Control-Increased aileron & rudder pressure, decreased stick pres.
Motion-Constant positive G, pitching down, rolling</td><td></td><td>Ct-4(I) 122.<table><tr><td>1</td><td>VA
CH</td><td>AC</td><td>F-10</td></tr><tr><td>2</td><td>L-2</td><td>RP</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>[illegible]</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates completing roll out just as wings level position reached at a slow airspeed</td><td></td></tr>
</table>

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Ct-4 **TASK** Cloverleaf

TASK GOAL To perform a cloverleaf **DATE** Feb., 1971

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(I) 3.	INVERTED WINGS LEVEL POSITION APPROACHING		Stops aileron & rudder pressure, increases elevator pressure
(J) 1.	MANEUVER CONTINUES DOWN BACK SIDE Visual-Pitch att:descending, inverted Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant aileron & rudder pressure, increasing stick pres. Motion-Constant positive G, pitching down		Ct-4 J 142 1 VA CM | 4-C | T-10 2 L-2 | MC | CJ 3 ER | EL TH | R-2
2.		Determines satisf. nose tracking rate, desired acceleration scheduling & need to reduce throttle	
3.			Maintains elevator pressure & adjusts throttle
(K) 1.	CONTINUES MANEUVER TOWARDS LEVEL FLIGHT Visual-Pitch att: descending Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. & reduced throttle Motion-Constant positive G, pitching up		Ct-4 (K) 121. 1 VA CM | 4-C | T-9 2 L-2 | RP | CJ 3 ER | EL | R-1
2.		Anticipates relaxing elevator pres. to have desired airspeed at wings level position	

SITUATION Aircraft straight & level at cruise speed and power

TASK NO. Ct-4 TASK Cloverleaf

TASK GOAL To perform a cloverleaf DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(K)	CONTINUES MANEUVER TOWARDS LEVEL FLIGHT		
3.			Relaxes elevator pressure gradually
(L)	APPROACHING LEVEL FLIGHT		
1.	Visual-Pitch att: climbing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Decreased stick pres. Motion-Decreasing positive G, pitching up		Ct-4 (L) 144. 1 VA CM 4C T-8 2 L-2 MC CJ 3 EA EL R-1
2.		Determines return to straight & level position at desired reference point & airspeed	
3.			Maintains constant elevator pressure
(M)	MANEUVER CONTINUES THROUGH LEVEL FLIGHT		
1.	Visual-Pitch att: climbing Bank att: level Outside reference: section line Instr. cross-check Aural-Normal envir. sound Control-Constant stick pres. Motion-Normal G		Ct-4 (M) 163A 1 VC 2-C FS 2 L-3 SC SJ 3 ER EL TH 3 R-3
2.		Observes position to start pull up & increase throttle	
3.			Coordinates elevator pressure & throttle
	PERFORM 3 MORE LEAVES IN THE SAME MANNER TO COMPLETE CLOVERLEAF MANEUVER.		

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 TASK Cuban Eight

TASK GOAL To perform a Cuban Eight DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS PRE-ENTRY ACCELERATION		Ct-5(A) 161. 1 V 1-C T-3 2 L-3 SC SJ 3 ER EL/TH R-3
1.	Visual-Pitch att: cruise Bank att: level Outside reference: section line Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		
2.		Observes position to commence descent & increase throttle	
3.			Coordinates elevator movement & throttle adjustment
(B)	STARTS SHALLOW DIVE		Ct-5(B) 102. 1 VA/CM 4C T-10 2 L-2 MC CJ 3 EA EL/TR R-2
1.	Visual-Pitch att. descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure; throttle adv. Motion-Negative G onset, acceleration, pitching down		
2.		Determines satisf. descent attitude, need for trim	
3.			Maintains elevator pressure & adjusts trim
(C)	BEGINS RETURN TO LEVEL FLIGHT		
1.	Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 TASK Cuban Eight

TASK GOAL To perform a Cuban Eight DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	BEGINS RETURN TO LEVEL FLIGHT Control-Neutral stick pres. Motion-Normal G,acceleration		Ct-5(C) 86 1 VA M 3-C F-6 2 L-2 MC SJ 3 ER EL R-1
2.		Determines proper airspeed at return to straight and level flight	
3.			Moves elevator
(D) 1.	STARTS PULLUP Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Positive G onset, pitching up		Ct-5 (D) 146 1 V CM 3-C F-6 2 L-2 MC CJ 3 ER EL R1
2.		Determines satisf. rate of nose movement & req'd acceleration schedule approaching	
3.			Increases elevator pressure
(E) 1.	CONTINUES PULLUP Visual-Pitch att:increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching up		Ct 5 (E) 142 1 VA CM 4-C T-7 2 L-2 MC CJ 3 ER AI EL RI
2.		Determines wings level, constant rate of nose movement, & req'd acceleration schedule	

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 **TASK** Cuban Eight

TASK GOAL To perform a Cuban Eight **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E) 3.	CONTINUES PULLUP		Maintains aileron, & increases elevator pressure
(F) 1.	CONTINUES PULLUP TO VERTICAL POSITION Visual-Pitch att:increasing Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching up		Ct-5 (F) 141 1 VA CM 4-C T-7 2 L-2 RP SJ 3 [illegible] EL R-1
2.		Anticipates reaching vertical position & relaxing stick pressure slightly	
3.			Maintains elevator pressure
(G) 1.	CONTINUES MANEUVER OVER THE TOP Visual-Pitch att:increasing Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. Motion-Constant positive G, pitching		Ct-5 (G) 141 1 VA CM 4-C T-8 2 L-2 MC CJ 3 EE EL R-1
2.		Determines constant G scheduling, constant rate of nose movement, wings level	
3.			Maintains elevator pressure

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 **TASK** Cuban Eight

TASK GOAL To perform a Cuban Eight **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(H)	CONTINUES MANEUVER DOWN THE BACK SIDE		
1.	Visual-Pitch att: dive, inverted Bank att: level, inverted Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. Motion-Constant positive G, pitching down		Ct-5 (H) 125. 1 VA CM · 4C · TP 2 L4 · RP · CJ 3 ER · GL BL } · RS
2.		Anticipates relaxing stick pressure approaching 45° position below horizon & starting half roll	
3.			Relaxes elevator pres. slightly, coordinates aileron & rudder
(I)	CONTINUES HALF ROLL		
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound Control-Decreased stick pres, increased aileron & rudder pressure Motion-Decreasing positive G, pitching down, rolling		Ct-5(I) 123. 1 VA CM · 4C · TO 2 L3 · RP · CJ 3 ER · RV BL } · RS
2.		Anticipates increased rudder pressure to hold desired ref. point & decreased stick pres. to keep nose track	
3.			Coordinates increased rudder pressure & decreased elevator pressure

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 TASK Cuban Eight

TASK GOAL To perform a Cuban Eight DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J)	STOPS ROLL		
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound Control-Increased rudder pressure, decreased stick pressure Motion-Decreasing positive G, pitching down, rolling		Ct-6 (J) 165 1 VA CM 4C T-9 2 L-3 SC SJ 3 ER AR RU R-3
2.		Observes point to roll out	
3.			Coordinates aileron & rudder pressure
(K)	COMPLETES ROLL & STARTS INITIAL PULLUP INTO ANOTHER LOOP ENTRY		
1.	Visual-Pitch att: dive Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Decreased stick & rudder pressure Motion-Decreased positive G, pitching down		Ct-6 (K) 41 1 VA CM 4C T-9 2 L-2 RP SJ 3 ER RU R-1
2.		Anticipates pullup into loop	
3.			Increases rudder pressure
(L)	CONTINUES PULLUP		
1.	Visual-Pitch att: increasing Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick & rudder pressure Motion-Constant positive G, pitching up		Ct-6 (L) 143 1 VA CM 4C F-8 2 L-2 MC SJ 3 ER A/BL R-2

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 **TASK** Cuban Eight

TASK GOAL To perform a Cuban Eight **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L)	CONTINUES PULLUP		
2.		Determines wings level, constant rate of nose movement, & req'd acceleration schedule	
3.			Maintains aileron & increases elevator pressure
(M)	CONTINUES PULLUP TO VERTICAL POSITION		
1.	Visual-Pitch att:increasing Bank att: level Outside reference Aural-Change in envir. sound Control-Increased stick pressure Motion-Constant positive G, pitching up		Ct-5(M) 121. 1 VA CM 4C T-7 2 L-2 RP CJ 3 ER EL R-1
2.		Anticipates reaching vertical position, & relaxing stick pressure slightly	
3.			Maintains elevator pressure
(N)	CONTINUES MANEUVER OVER THE TOP		
1.	Visual-Pitch att: increasing Bank att: level, inverted Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick pressure Motion-Constant positive G, pitching up		Ct-5 (N) 141. 1 VA CM 4C T-8 2 L-2 MC CJ 3 ER EL R-1
2.		Determines constant G scheduling, constant rate of nose movement, & wings level	

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 TASK Cuban Eight

TASK GOAL To perform a Cuban Eight DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(N) 8.	CONTINUES MANEUVER OVER THE TOP		Maintains elevator pressure
(O) 1.	CONTINUES MANEUVER DOWN THE BACK SIDE Visual-Pitch att: dive, inverted Bank att: level, inverted Outside reference Aural-Change in envir. sound Control-Constant stick pres. Motion-Constant positive G, pitching down		Ct-5(O) 125. 1 VA CM 4-8 T-7 2 L-4 RP CJ 3 ER EL RU EU} R5
2.		Anticipates relaxing stick pressure approaching 45° position below horizon & starting half roll in opposite direction of first roll	
3.			Relaxes elevator pressure slightly, coordinates aileron & rudder
(P) 1.	CONTINUES HALF ROLL Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound Control-Decreased stick pres, increased aileron & rudder pressure Motion-Decreasing positive G, pitching down, rolling		Ct-5(P) 123. 1 VA CM A-C T-10 2 L-3 RP CJ 3 ER RU EL} R-3
2.		Anticipates increased rudder pressure to hold desired ref. point & decreased stick pres. to keep nose track	

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 **TASK** Cuban Eight

TASK GOAL To perform a Cuban Eight **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(P)</td><td>CONTINUES HALF ROLL</td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates increased rudder pressure & decreased elevator pressure</td></tr>
<tr><td>(Q)</td><td>STOPS ROLL</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: dive
Bank att: rolling
Outside reference
Aural-Change in envir. sound
Control-Increased rudder pressure, decreased stick pressure
Motion-Decreasing positive G, pitching down, rolling</td><td></td><td>Q-6 (Q) 185.<table><tr><td>1</td><td>VA
CM</td><td>AC</td><td>T-9</td></tr><tr><td>2</td><td>L-3</td><td>SC</td><td>ST</td></tr><tr><td>3</td><td>ER</td><td>AI
EV</td><td>R-3</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Observes point to roll out of half roll</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder pressure to stop roll</td></tr>
<tr><td>(R)</td><td>COMPLETES ROLL & STARTS LEVEL OFF</td><td></td><td></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: dive
Bank att: level
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Decreased stick & rudder pressure
Motion-Decreased positive G, pitching down</td><td></td><td>Q-5 (R) 44.<table><tr><td>1</td><td>VA
OM</td><td>AC</td><td>T-9</td></tr><tr><td>2</td><td>L-2</td><td>RP</td><td>ST</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates return to straight & level flight</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Increases elevator pressure</td></tr>
</table>

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-5 TASK Cuban Eight

TASK GOAL To perform a Cuban Eight DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(S) 1.	LEVELS OFF Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. Motion-Increasing positive G, pitching up		Ct-5(S) MC 1 VA CM 4-C TP 2 L-2 MC ST 3 BR EL TH R-2
2.		Determines desired nose movement, & anticipates reducing throttle	
3,			Maintains constant elevator pressure & adjusts throttle
(T) 1.	LEVEL FLIGHT ACHIEVED Visual-Pitch att: climb Bank att: level Outside reference Aural-Change in envir. sound Control-Constant stick pres., throttle decrease Motion-Constant positive G, pitching up		Ct-5(T) M 1 VA CM 4-C FP 2 L-2 MC ST 3 BA EL TR R-2
2.		Determines level flight approaching	
3.			Decreases elevator pressure & adjusts trim
(U) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: cruise Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal positive G		Ct-5(U) a 1 V 1-C FA 2 L-1 MC ST 3 BA — —
2.		Determines goal est.	

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 **TASK** Immelman Turn

TASK GOAL To perform an Immelman Turn **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A) 1.	BEGINS ENTRY ACCELERATION Visual-Pitch att: cruise Bank att: level Outside reference: section line Aural-Normal envir. sound Control-Neutral pressure Motion-Normal G		Ct-6 (A) 161 1 V 1-C T-3 2 L-3 SC SJ 3 ER EL TH R-3
2.		Observes position to commence descent & increase throttle	
3.			Coordinates elevator movement & throttle adjustment
(B) 1.	STARTS SHALLOW DIVE Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound Control-Increased stick pressure;throttle adv. Motion- **Negative** G onset, acceleration, pitching down		Ct-6 (B) 102 1 VA CM 4-C 7-10 2 L-2 MC CJ 3 EA EL TR R-2
2.		Determines satisf. descent attitude; need for trim	
3.			Maintains elevator pressure & adjusts trim
(C) 1.	BEGINS RETURN TO LEVEL FLIGHT Visual-Pitch att: descent Bank att: level Outside reference: section line Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 TASK Immelman Turn

TASK GOAL To perform an Immelman Turn DATE Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(C)	BEGINS RETURN TO LEVEL FLIGHT		
1.	Control-Neutral stick pres. Motion-Normal G;acceleration		Ct-6 (C) 66. 1 VA M 3-C T-6 2 L-2 MC SJ 3 ER EL R-1
2.		Determines proper airspeed at return to straight and level flight	
3.			Moves elevator
(D)	STARTS PULLUP		
1.	Visual-Pitch att:increasing Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Increased stick pres. Motion-Positive G onset, pitching up		Ct-6 (D) 126. 1 VC M 3C T-7 2 L-2 RP CJ 3 ER EL R-1
2.		Anticipates incr. rate of nose movement & achieving req'd acceleration schedule	
3.			Increases elevator pressure
(E)	CONTINUES PULLUP		
1.	Visual-Pitch att: increasing Bank att: level Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching up		Ct-6 (E) 142. 1 VA CM 4C T-7 2 L-2 MC CJ 3 ER AI EL R-2
2.		Determines wings level, constant rate of nose movement, & acceleration schedule	

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 TASK Immelman Turn

TASK GOAL To perform an Immelman Turn DATE Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(E)
3.</td><td>CONTINUES PULLUP</td><td></td><td>Maintains aileron position & increases elevator pressure</td></tr>
<tr><td>(F)
1.</td><td>CONTINUES PULLUP TO VERTICAL POSITION
Visual-Pitch att: increasing
Bank att: level
Outside reference
Aural-Change in envir. sound
Control-Constant stick pres.
Motion-Constant positive G, pitching up</td><td></td><td>Ct-6 (F) 121.<table><tr><td>1</td><td>VA
CM</td><td>4C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>RP</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates reaching vertical position & relaxing stick pressure slightly</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Relaxes elevator pressure</td></tr>
<tr><td>(G)
1.</td><td>CONTINUES MANEUVER OVER THE TOP
Visual-Pitch att: increasing
Bank att: level
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Decreased stick pres.
Motion-Constant positive G, pitching up</td><td></td><td>Ct-6 (G) 141.<table><tr><td>1</td><td>VA
CN</td><td>4C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines constant G scheduling, constant rate of nose movement, wings level, & need to incr. stick pres.</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Increases elevator pressure</td></tr>
</table>

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 **TASK** Immelman Turn

TASK GOAL To perform an Immelman Turn **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(H) 1.	CONTINUES MANEUVER ON TOP Visual-Pitch att: level inverted Bank att: level, inverted Outside reference Aural-Change in envir. sound Control-Increased stick pres. Motion-Constant positive G, pitching down		Ct-6 (H) 141. 1 VA CM 4-C T-7 2 L-2 MC CJ 3 ER EL R-1
2.		Determines desired nose movement & acceleration schedule	
3.			Maintains elevator pressure
(I) 1.	STARTS ROLL OUT Visual-Pitch att: dive, inverted Bank att:wings level, inverted Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres. Motion-Constant positive G, pitching down		Ct-6 (I) 125. 1 VA CM 4C T-7 2 L-4 RP CJ 3 ER AL RU EL R-5
2.		Anticipates reaching roll out point above horizon & starting roll out	
3.			Coordinates aileron & rudder movement, relaxes elevator pressure
(J) 1.	CONTINUES ROLL OUT Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound		

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 **TASK** Immelman Turn

TASK GOAL To perform an Immelman Turn **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(J)	CONTINUES ROLL OUT		Ct-6 (J) 142
1.	Control-Increased aileron & rudder pressure Motion-Decreasing positive G, pitching, rolling		1 VA CM · AC · T-9 2 L-2 · MC · CJ 3 ER · Al RU · R-2
2.		Determines desired roll out rate & nose tracking in vertical plane	
3.			Maintains aileron & rudder pressure
(K)	CONTINUES ROLL OUT		Ct-6 (K) 125
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound Control-Constant stick & rudder pressure Motion-Decreasing positive G, pitching, rolling		1 VA CM · AC · T-9 2 L-4 · RP · CJ 3 ER · Al RU } EL · R-5
2.		Anticipates need to increase stick pres. as level flight att. is approached	
3.			Coordinates aileron & rudder, increases elevator pressure
(L)	CONTINUES ROLL OUT		Ct-6 (L) 122
1.	Visual-Pitch att: dive Bank att: rolling Outside reference Aural-Change in envir. sound Control-Constant aileron & rudder pressure, incr. stick pressure Motion-Decreasing positive G, pitching, rolling		1 VA CM · AC · T-10 2 L-2 · RP · CJ 3 ER · RU EL Al · R-2

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 **TASK** Immelman Turn

TASK GOAL To perform an Immelman Turn **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L)	CONTINUES ROLL OUT		
2.		Anticipates need to increase rudder pres. to hold nose in the vertical plane	
3.			Increases rudder pressure, maintains constant elevator pressure, decreases aileron pressure
(M)	ESTABLISHES WINGS LEVEL		
1.	Visual-Pitch att: climb Bank att: rolling Outside reference Aural-Normal envir. sound Control-Incr. rudder pres., decreased aileron pres, & constant stick pressure Motion-Normal positive G, pitching, rolling		Ct-6 (M) 27 1 V CM | 3-e | T-8 2 L-2 | MC | SJ 3 EA | RU.E AI.TR | R2
2.		Determines wings level attitude, nose slightly above horizon	
3.			Relaxes rudder & aileron pressure, maintains elevator pressure, adjusts trim

SITUATION Aircraft straight and level at cruise speed and power

TASK NO. Ct-6 **TASK** Immelman Turn

TASK GOAL To perform an Immelman Turn **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(N) 1.	ESTABLISHES STEADY-STATE Visual-Pitch att: climb Bank att: level Aural-Normal envir. sound Control-Neutral pressure Motion-Normal positive G		Ct-6 (N) a 1 V 1-C T-2 2 L-1 MC SJ 3 EA — —
2.		Determines goal is established	
3.			Maintains cruise control

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(A)	BEGINS ENTRY ACCELERATION		Ct-7 (A) 161. 1 V 1-C T-4 2 L-3 SC SJ 3 ER EL TH R-3
1.	Visual-Pitch att: cruise Bank att: level Outside reference Instr. cross-check Aural-Normal envir. sound Control-Neutral stick pres. Motion-Normal positive G		
2.		Observes point to commence descent and increase throttle slightly	
3.			Coordinates elevator movement & throttle adjustment
(B)	STARTS SHALLOW DIVE		Ct-7 (B) 142. 1 VA CN 4C T-10 2 L-2 MC CJ 3 ER EL TR R-2
1.	Visual-Pitch att: descent Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick pres, throttle advance Motion-Negative G onset, acceleration, pitching down		
2.		Determines satisfactory descent attitude & need for trim	
3.			Maintains elevator pressure & adjusts trim
(C)	BEGINS RETURN TO LEVEL FLIGHT & START OF CLIMB		
1.	Visual-Pitch att: descent Bank att: level Outside reference Instr. cross-check Aural-Change in envir. sound		

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(C)</td><td colspan="2">BEGINS RETURN TO LEVEL FLIGHT & START OF CLIMB</td><td rowspan="2">Ct-7 (C) 66<table><tr><td>1</td><td>VA
M</td><td>3-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>SJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Control-Neutral stick pres.
Motion-Normal G, acceleration, pitching down</td><td></td></tr>
<tr><td>2.</td><td></td><td>Determines proper airspeed achieved to start pull up into vertical climb</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Moves elevator</td></tr>
<tr><td>(D)</td><td colspan="3">BEGINS ACCELERATED CLIMB SCHEDULE TO VERTICAL FLIGHT</td></tr>
<tr><td>1.</td><td>Visual-Pitch att: climb
Bank att: level
Instr. cross-check
Aural-Normal envir. sound
Control-Increased stick pres.
Motion-Positive G onset, pitching up</td><td></td><td>Ct-7(D) 146.<table><tr><td>1</td><td>V
CM</td><td>3-C</td><td>T-7</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines desired rate of pitch change obtained</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains constant elevator pressure</td></tr>
<tr><td>(E)</td><td>CLIMB SCHEDULE CONTINUED</td><td></td><td rowspan="2">Ct-7 (E) 1.<table><tr><td>1</td><td>VA
CM</td><td>4C</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>RP</td><td>SJ</td></tr><tr><td>3</td><td>EA</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: climb
Bank att: level
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Constant stick pres.
Motion-Constant positive G, pitching up</td><td></td></tr>
<tr><td>2.</td><td></td><td>Anticipates need to relax stick pres. to establish vertical flight</td><td></td></tr>
</table>

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(E) 3.	CLIMB SCHEDULE CONTINUED		Relaxes elevator pressure
(F) 1.	VERTICAL FLIGHT ATTITUDE REACHED Visual-Pitch att: climb Bank att: level Outside reference Instr. cross-check Aural-Changing envir. sound Control-Decreased stick pres. Motion-Decreasing positive G, pitching stabilized		G-7 (F) 62. 1 VA CM · 4C · T-8 2 L-2 · MC · SJ 3 ER · AI RU EL · R-2
2.		Determines reaching vertical flight attitude with rapidly decreasing airspeed	
3.			Maintains aileron, rudder & elevator pressure
(G) 1.	INITIATES RECOVERY ROLL Visual-Pitch att: climb Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick, aileron & rudder pressure Motion-Decreasing positive G, pitching up		G-7 (G) 65. 1 VA CM · 4C · T-10 2 L-4 · MC · SJ 3 ER · AI3 RU3 EL TH · R-5
2.		Determines roll required toward low wing & need for power increase	
3.			Coordinates aileron & rudder, increases elevator, adjusts throttle

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOR ACTION</th></tr>
<tr><td>(H)
1.</td><td>CONTINUES ROLL
Visual-Pitch att: climb
Bank att: rolling
Outside reference
Aural-Change in envir. sound
Control-Increased stick & rudder pressure, throttle advance
Motion-Increasing positive G, pitching down, rolling</td><td></td><td>G-7 (H) 142.<table><tr><td>1</td><td>VA
CM</td><td>4-C</td><td>T-10</td></tr><tr><td>2</td><td>L-2</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>AI
RU
EL</td><td>R-2</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines roll rate satisfactory & nose coming down smoothly toward horizon</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains aileron & rudder pressure, relaxes elevator pressure slightly</td></tr>
<tr><td>(I)
1.</td><td>ROLLS OUT, AIRCRAFT INVERTED
Visual-Pitch att: descent
Bank att: rolling
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Constant stick & rudder pressure
Motion-Decreasing positive G, pitching down, rolling</td><td></td><td>G-7 (I) 145<table><tr><td>1</td><td>VA
CM</td><td>4C</td><td>T-10</td></tr><tr><td>2</td><td>L-4</td><td>MC</td><td>CJ</td></tr><tr><td>3</td><td>ER</td><td>AI
RU
EL</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Determines attitude position to roll aircraft out inverted</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder, maintains elevator pressure</td></tr>
</table>

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

<table>
<tr><th>EL. SEQ.</th><th>CUES</th><th>MENTAL ACTION</th><th>MOTOP ACTION</th></tr>
<tr><td>(J)</td><td colspan="2">AIRCRAFT NOSE DESCENDS TO HORIZON, INVERTED</td><td rowspan="2">Ct-7 (J) 167.<table><tr><td>1</td><td>VA
CM</td><td>AC</td><td>T-8</td></tr><tr><td>2</td><td>L-2</td><td>IP</td><td>ST</td></tr><tr><td>3</td><td>ER</td><td>EL</td><td>R-1</td></tr></table></td></tr>
<tr><td>1.</td><td>Visual-Pitch att: descent
Bank att: wings level, inverted
Outside reference
Aural-Change in envir. sound
Control-Increased stick & rudder pressure
Motion-Decreasing positive G, pitching down</td><td></td></tr>
<tr><td>2.</td><td></td><td>Sustains flying nose down to horizon</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Maintains constant elevator pressure</td></tr>
<tr><td>(K)</td><td colspan="3">NOSE PASSES THROUGH HORIZON INVERTED & STARTS ROLL</td></tr>
<tr><td>1</td><td>Visual-Pitch att: descent, inverted
Bank att: level
Outside reference
Instr. cross-check
Aural-Change in envir. sound
Control-Constant stick pres.
Motion-Normal positive G, pitching down</td><td></td><td>Ct-7 (K) 45<table><tr><td>1</td><td>VA
CM</td><td>A-C</td><td>T-7</td></tr><tr><td>2</td><td>L-4</td><td>RP</td><td>ST</td></tr><tr><td>3</td><td>ER</td><td>AL
RU
EL</td><td>R-5</td></tr></table></td></tr>
<tr><td>2.</td><td></td><td>Anticipates relaxing back pressure after nose passes thru horizon, & rolling out to straight & level flight</td><td></td></tr>
<tr><td>3.</td><td></td><td></td><td>Coordinates aileron & rudder, relaxes elevator pressure</td></tr>
</table>

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(L) 1.	CONTINUES ROLL Visual-Pitch att:changing Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Increased stick & rudder pressure Motion-Normal positive G, rolling		Ct-7(L) 142 1 VA CM | 4C | T-8 2 L-2 | MC | CT 3 ER | AI TH | R-2
2.		Determines satisfactory roll rate & need to reduce thrust	
3.			Maintains constant stick pressure & adjusts throttle
(M) 1.	STOPS ROLL AT STRAIGHT & LEVEL FLIGHT Visual-Pitch att: changing Bank att: rolling Outside reference Instr. cross-check Aural-Change in envir. sound Control-Constant stick pres, throttle decrease Motion-Normal positive G, rolling		Ct-7 (M) 171 1 VA CM | A-C | T-8 2 L-3 | SC | ST 3 EA | AL RU EL } | R-4
2.		Observes position to stop roll out at straight & level flight	
3.			Coordinates aileron, rudder & elevator

SITUATION Aircraft straight & level at cruise speed & power

TASK NO. Ct-7 **TASK** Vertical Recovery

TASK GOAL To regain straight & level flight from low airspeed vertical attitude **DATE** Feb., 1974

EL. SEQ.	CUES	MENTAL ACTION	MOTOR ACTION
(N)	AIRCRAFT RETURNS TO STRAIGHT	& LEVEL FLIGHT	Ct-7(N) 0. 1 V C | 2-C | T-S 2 L-1 | MC | ST 3 EA | — | —
1.	Visual-Pitch att: cruise Bank att: level Outside reference Aural-Normal envir. sound Control-Decreased stick & rudder pressure Motion-Normal positive G,		
2.		Determines aircraft returned to straight & level flight & goal is established	
3.			Maintains cruise control

APPENDIX D

SORTING SLOT CONTENTS

Sorting Slot Contents

Simple Judgment - EA/RP (Slot 1-20)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
1.	Cp-1(B)/Ct-7(E)	11.	None
2.	Cp-8(I)	12.	Cp-9(A), Cp-10(A), Cp-11(A),
3.	None		Cp-12(A)
4.	None	13.	None
5.	Ct-1(M)	14.	Cp-1(A)
6.	Cp-5(D)	15.	None
7.	Cp-11(E)/Cp-12(H)	16.	None
8.	None	17.	Cp-2(A)
9.	None	18.	None
10.	None	19.	None
		20.	F-1(A)

Simple Judgment - EA/MC (Slots 21-40)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
21.	Cp-1(C)	27.	F-2(C), F-3(D), F-4(D),
22.	F-7(C), F-10(C), F-14(C)/		F-5(D), F-6(D), F-7(D),
	F-14(D), Cp-5(L), F-13(D),		F-8(D), F-9(D), F-10(D),
	Ct-5(T)/Cp-1(K), Ct-2(L)/		F-11(D), F-12(D)/Cp-12(C),
	F-4(C), Cp-2(V)		Ct-6(M)/F-1(D)/F-13(C)
23.	None	28.	None
24.	None	29.	None
25.	Cp-1(M)	30.	Cp-2(P)/Cp-11(C)/Cp-12(E)
26.	Cp-3(J), Cp-6(J)	31.	None
			Continued on the next page.

Sorting Slot Contents

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
32.	Cp-9(B), Cp-9(C), Cp-9(D),	34.	None
	Cp-9(E), Cp-12(I), Cp-9(F),	35.	Cp-1(L)
	Cp-11(F), Cp-13(L), Ct-1(N)	36.	Cp-3(A)
33.	None		37-38-39-40 None

	Simple Judgment - ER/RP (Slots 41-60)		
Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
41.	Cp-6(E), Ct-1(H), Ct-1(L),	52.	None
	Ct-5(F)/Cp-8(G), Ct-5(K)/	53.	F-5(A), F-6(A)
	Ct-5(R)	54.	None
42.	Cp-1(F)/Cp-1(H)/Cp-1(J)/	55.	F-4(A)/Cp-4(H)/Cp-13(A)
	Cp-8(D)	56.	Cp-5(A)/Cp-8(A)
43.	None	57.	F-7(A), F-13(A), F-14(A)
44.	None		Cp-6(A)
45.	Cp-13(J)/Ct-1(K)/Ct-(K)	58.	F-2(A), F-3(A), F-9(A),
	46-47-48 None		F-10(A), F-12(A)
49.	Ct-2(B)	59.	None
50.	Ct-3(C)	60.	F-8(A), F-11(A), Cp-3(A),
51.	None		Cp-4(A)

	Simple Judgment - ER/MC (Slots 61-80)		
Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
61.	Cp-5(H)/Cp-3(E)	62.	Cp-1(D), Cp-8(E), Cp-8(F)/
			Cp-2(I)/Cp-5(E)/Cp-6(E)/
	Continued on the next page.		Cp-7(A)/Cp-8(H)/Ct-7(E)

Sorting Slot Contents

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
	63-64 None	68.	None
65.	Cp-1(I), Cp-2(G)/Cp-7(E),	69.	Cp-13(G)
	Cp-12(G)/Cp-12(F)/Ct-7(G)		70 - 74 None
66.	Ct-1(C), Ct-4(C), Ct-5(C),	75.	Cp-10(B), Cp-11(B), Cp-12(B
	Ct-6(C)/Cp-6(K), Ct-7(C)		Cp-12(D)
67.	Cp-2(H), Cp-5(K)/Cp-10(D),		76 - 80 None
	Cp-11(D)		

Complex Judgment - EA/RP (Slots 81-100)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
81.	None	87.	Cp-10(E)
82.	Cp-2(T)		88 - 100 None
	83 - 86 None		

Complex Judgment - EA/MC (Slots 101-120)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
101.	Cp-5(G)/Cp-5(J)	106.	Cp-5(C), Cp-6(C), Cp-6(D),
102.	F-2(C), F-3(C), F-5(C),		Cp-6(H)
	F-6(C), F-9(C), F-12(C)/	107.	F-8(C), F-11(C)/Cp-6(L)/
	Cp-2(U)/Cp-7(G)/Ct-1(B)/		Cp-13(C)
	Ct-4(B), Ct-5(B), Ct-6(B),	108.	Ct-3(G)
	Cp-13(K)	109.	None
	103-104 None	110.	Cp-2(M)/Cp-10(C)
105.	F-1(C)		111 - 120 None

Sorting Slot Contents

Complex Judgment - ER/RP (Slots 121-140)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
121.	Ct-1(F), Ct-5(M), Ct-6(F)/	125.	Ct-4(F), Ct-5(H), Ct-5(O),
	Ct-4(K)		Ct-6(I), Ct-6(K)/Cp-8(C)
122.	Ct-2(G), Ct-2(I), Ct-4(I),	126.	Ct-1(P), Ct-6(D)/Cp-7(D)
	Ct-6(L)		127-128 None
123.	Ct-5(I), Ct-5(P)	129.	Cp-13(F), Ct-3(E), Ct-3(F)/
124.	None		Ct-2(E)
			130 - 140 None

Complex Judgment - ER/MC (Slots 141-160)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
141.	F-13(B), F-14(B), Ct-1(G),	144.	Ct-2(F), Ct-2(J), Ct-2(K),
	Ct-1(I), Ct-4(L), Ct-5(G),		Ct-4(G)/Ct-1(J)
	Ct-5(N), Ct-6(H), Ct-6(G)/	145.	Cp-1(G), Cp-7(B), Cp-7(C),
	Cp-6(B), Cp-6(G)		Cp-8(B), Ct-2(H), Ct-4(H),
142.	F-2(B), F-3(B), F-5(B),		Ct-7(I)/Cp-2(B), Cp-2(C),
	F-6(B), F-7(B), F-13(B),		Cp-2(E), Cp-2(F), Cp-2(L),
	F-10(B), F-12(B), Ct-5(S)/		Cp-2(O)/Cp-2(K)
	Ct-1(E), Ct-5(E), Ct-5(L),	146.	Cp-3(D), Cp-3(H), Cp-5(B),
	Ct-6(E)/Cp-2(J), Cp-2(S),		Cp-6(I), Ct-7(D)/Cp-3(I),
	Ct-4(J)/Cp-7(F), Ct-7(H)/		Ct-5(D)
	Cp-1(E), Ct-7(B)/Cp-5(F)/	147.	Cp-3(B), Cp-3(F), Cp-4(B),
	Cp-13(B)/Ct-4(E), Ct-6(J),		Cp-4(F)/F-11(B)/Cp-5(I),
	Ct-7(L)		Ct-4(D)
143.	None	148.	Cp-13(E), Ct-3(D)

Cont'd next page

Sorting Slot Contents

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
149.	Ct-2(C)	157.	Cp-2(R)
	150 - 156 None		158 - 160 None

Simple Judgment - ER/SC (Slots 161-165)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
161.	Ct-1(A), Ct-4(A), Ct-5(A),	163.	Cp-4(C), Cp-4(D), Cp-4(G)/
	Ct-6(A), Ct-7(A)		Ct-4(M)
162.	Cp-2(A), Ct-2(A)	164.	Cp-3(E), Cp-13(I)
		165.	Ct-5(J), Ct-5(Q)

Simple Judgment ER/IP(Slots 166-167)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
166.	Cp-2(D)	167.	Ct-7(J)

Simple Judgment EA/IP (Slots 168-169)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
168.	Cp-13(D)	169.	Cp-13(H)
		170.	None

Complex Judgment EA/SC (Slots 171-175)

Slot No.	Basic Skill Groups	Slot No.	Basic Skill Groups
171.	Ct-7(M)		172 - 175 None

Complex Judgment EA/IP (Slots 176-180)

176.	Cp-2(Q)		177 - 180 None

APPENDIX E

MATRIX BACKGROUND DATA

HORIZONTAL SORT COMBINATIONS

Behavioral Element	Sorting Slots
Simple Judgment	1-80, 161-170
Complex Judgment	81-160, 171-180
Establish Attitude	1-40, 81-120
Establish Rate of Attitude Change	41-80, 121-160
Multi-Cue Processing	21-40, 61-80, 101-120, 141-160
Memory Recall Processing	1-20, 41-60, 81-100, 121-140
Specific Cue Processing	161-165, 171-175
Iterative Processing	166-170, 176-180
1 Cue Complexity	16-20, 36-40, 56-60, 76-80, 96-100, 116-120, 136-140, 156-160
2 Cue Complexity	11-15, 31-35, 51-55, 71-75, 91-95, 111-115, 131-135, 151-155
3 Cue Complexity	6-10, 26-30, 46-50, 66-70, 86-90, 106-110, 126-130, 146-150
4 Cue Complexity	1-5, 21-25, 41-45, 61-65, 81-85, 101-105, 121-125, 141-145
Rank 1 Motor Action Complexity	1, 6, 11, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96, 101, 106, 111, 116, 121, 126, 131, 136, 141, 146, 151, 156
Rank 2 Motor Action Complexity	2, 7, 12, 17, 22, 27, 32, 37, 42, 47, 52, 57, 62, 67, 72, 77, 82, 87, 92, 97, 102, 107, 112, 117, 122, 127, 132, 137, 142, 147, 152, 157
Rank 3 Motor Action Complexity	3, 8, 13, 18, 23, 28, 33, 38, 43, 48, 53, 58, 63, 68, 73, 78, 83, 88, 93, 98, 103, 108, 113, 118, 123, 128, 133, 138, 143, 148, 153, 158
Rank 4 Motor Action Complexity	4, 9, 14, 19, 24, 29, 34, 39, 44, 49, 54, 59, 64, 69, 74, 79, 84, 89, 94, 99, 104, 109, 114, 119, 124, 129, 134, 139, 144, 149, 154, 159
Rank 5 Motor Action Complexity	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160

APPENDIX F

BIBLIOGRAPHY

BIBLIOGRAPHY

This annotated bibliography presents a general review of the research related to taxonomy development and application with special emphasis on items related to flying tasks. It is a continuation of the bibliography from the Volume I Report. The references are organized by topics which are: 1. general background, 2. general task and taxonomy, and 3. related flying items. Each topic is explained with the associated references following.

General Background References - The references of this topic provide a basic framework for system organization and development. In addition, cues obtained through the sensory system are discussed with respect to man's environment. Together, these items provide for an understanding of the complex requirements and methods for the analysis of flying tasks.

McCormick, E. J. Human Factors Engineering, McGraw-Hill Book Company, New York, 1970.

This text presents a survey of human factors engineering. The materials are drawn from a number of disciplines and are concerned with the human factors area, but especially from the behavioral and biological sciences aspect; in this connection the bulk of the material comes from the field of psychology. Chapters of particular importance to the taxonomy effort were: III - Human Sensory Process, IV - Information Input Process, VII - Mediation Process, and IX - Human Control of Systems.

Mowbray, G. H., and Gebard, J. W. Man's Senses as Information Channels, in W. Sinanco (ed.) Selected Papers on Human Factors in Design and Use of Control Systems, Dover Publications, Inc., New York, 1961.

This paper gives a comparison of the intensity ranges and discrimination abilities of the senses in the first section. The second section deals with multiple sensory inputs. This includes a discussion of simultaneous visual, aural, and motion inputs. The effects of multiple inputs to the same sensory channel are also discussed.

Poulton, E. C. Environment and Human Efficiency, Charles C. Thomas - Publisher, Springfield, Illinois, 1972.

This text summarizes and interprets recent research on human performance under environmental stress such as noise, acceleration and deceleration. Of particular importance were the following chapters: I - A Simple Model of Human Performance and II - Measuring the Effects of Environment.

General Task and Taxonomy References - The references of this topic provide theoretical and practical concepts of taxonomy development for learning theory and task analysis. Reports define, explain, and present examples of task analyses, taxonomies and related terms. The ideas discussed have relevance to the current taxonomy development.

Farina, A.J. Development of a Taxonomy of Human Performance: A Review of Descriptive Schemes for Human Task Behavior, AIR Technical Report No. 726-1/69-TR-2, January, 1969, AD 689 412.

This report reviews several schemes to describe the human behavior occurring during the performance of a task. The reviews were done to determine which schemes would be useful in the classification of tasks. Most schemes available had the following problem areas: 1. inprecise terms, 2. little measurement capability, and 3. little applicability to real world tasks.

Miller, R.B. Development of a Taxonomy of Human Performance: A User Oriented Approach, AIR Technical Report No. 726/2035-2/71-TR-6, March, 1971, AD 736 190.

This report proposes a real world approach for the development of new ways of describing and analyzing tasks and duties. Methodologies are proposed for the development of performance taxonomies. A number of laboratory oriented assumptions and procedures currently used in taxonomic development are shown as not being representative of actual user practice and so these taxonomies do not become useful decision-making tools.

Miller, R.B. Development of a Taxonomy of Human Performance: Design of a Systems Task Vocabulary, AIR Technical Report No. 726/2035-3/71-TR-11, March, 1971, AD 736 195.

Problems in developing a viable descriptive taxonomy are described and a format consisting of four major dimensions of description is proposed. A rationale for the development of a transactional language for describing and analyzing military tasks and duties was presented along with a new system-task vocabulary created according to that rationale. Input reception, memory, processing, and output effectors are the concepts in developing the set of terms which constitute the system-task vocabulary.

Wheaton, G.R. Development of a Taxonomy of Human Performance: A Review of Classificatory Systems Relating to Task and Performance, AIR Technical Report No. 726-12/68-TR-1, Dec., 1968, AD 689 411.

In this report past efforts in behavioral classification were reviewed to provide guidelines for future taxonomy efforts. The report concludes that behavioral taxonomy is still far from being a well defined science and that really good systems have yet to be developed.

Related Flying Items References - The references of this topic provide source material for current flight training techniques and devices. The references include current Air Force and FAA instructional texts for contact and instrument flying. Research in simulator technology and instructional techniques are also found here.

Langewiesche, W. Stick and Rudder, McGraw-Hill Book Company, New York, 1972.

This book contains an analysis of the art of flying and is written for general aviation. It shows and explains what the pilot does when he flies, how he does it, and why. Primary areas such as climbs, descents, turns and straight-and-level flight are discussed in terms of control movement and available cues. Some obvious and many not so obvious visual cues are illustrated and discussed. The text puts into words, ways to express the judgmental aspects of flying and concludes that judgment can be taught.